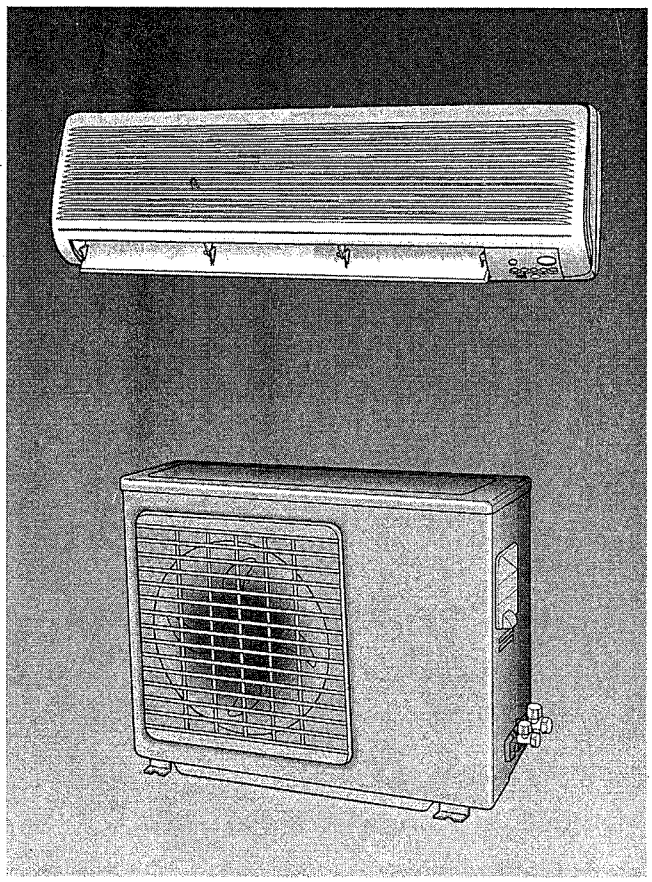
SAMSUNG

ROOM AIR CONDITIONER

INDOOR UNIT	OUTDOOR UNIT
AQV12ACME	UQV12ACME
AQV12ADME	UQV12ADME
AQV12BCME	UQV12BCME
AQV12BDME	UQV12BDME
SH12VAC	SH12VACX
SH12VAD	SH12VADX
AQV09ACME	UQV09ACME
AQV09ADME	UQV09ADME
AQV09BCME	UQV09BCME
AQV09BDME	UQV09BDME
SH09VAC	SH09VACX
SH09VAD	SH09VADX

SERVICE Manual

AIR CONDITIONER



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1. Precautions

1. Warning: Prior to repair, disconnect the power cord from the circuit breaker.

2. Use proper parts: Use only exact replacement parts. (Also, we recommend replacing parts rather than repairing them.)

3. Use the proper tools: Use the proper tools and test equipment, and know how to use them. Using defective tools or test equipment may cause problems later-intermittent contact, for example.

4. Power Cord: Prior to repair, check the power cord and replace it if necessary.

5. Avoid using an extension cord, and avoid tapping into a power cord. This practice may result in malfunction or fire.

6. After completing repairs and reassembly, check the insulation resistance.
   Procedure: Prior to applying power, measure the resistance between the power cord and the ground terminal. The resistance must be greater than 30 megaohms.

7. Make sure that the grounds are adequate.

8. Make sure that the installation conditions are satisfactory.
   Relocate the unit if necessary.

9. Keep children away from the unit while it is being repaired.

10. Be sure to clean the unit and its surrounding area.

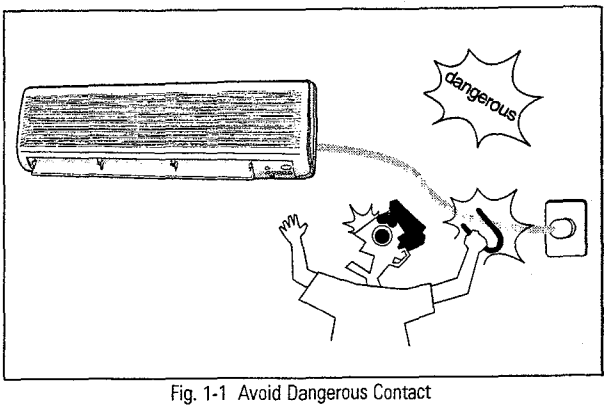


Fig. 1-1 Avoid Dangerous Contact

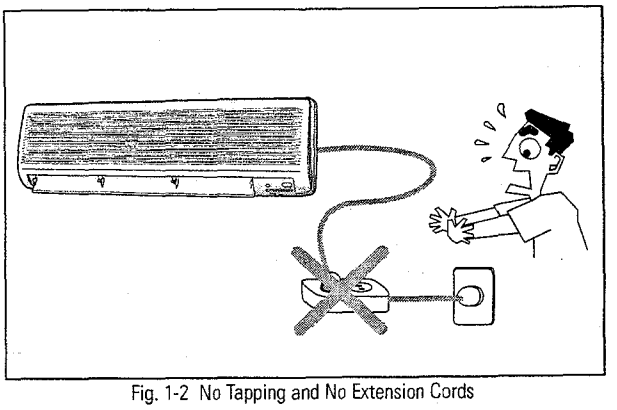


Fig. 1-2 No Tapping and No Extension Cords

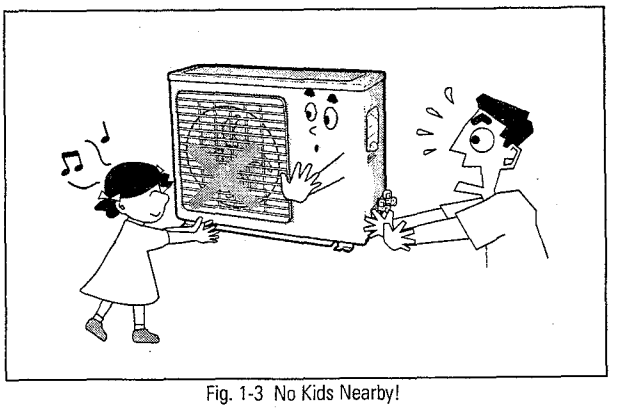


Fig. 1-3 No Kids Nearby!

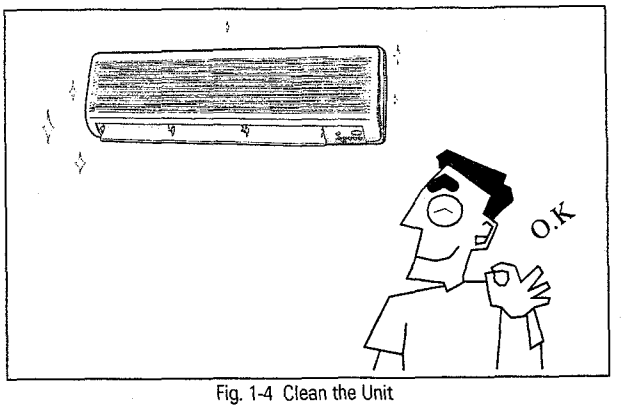
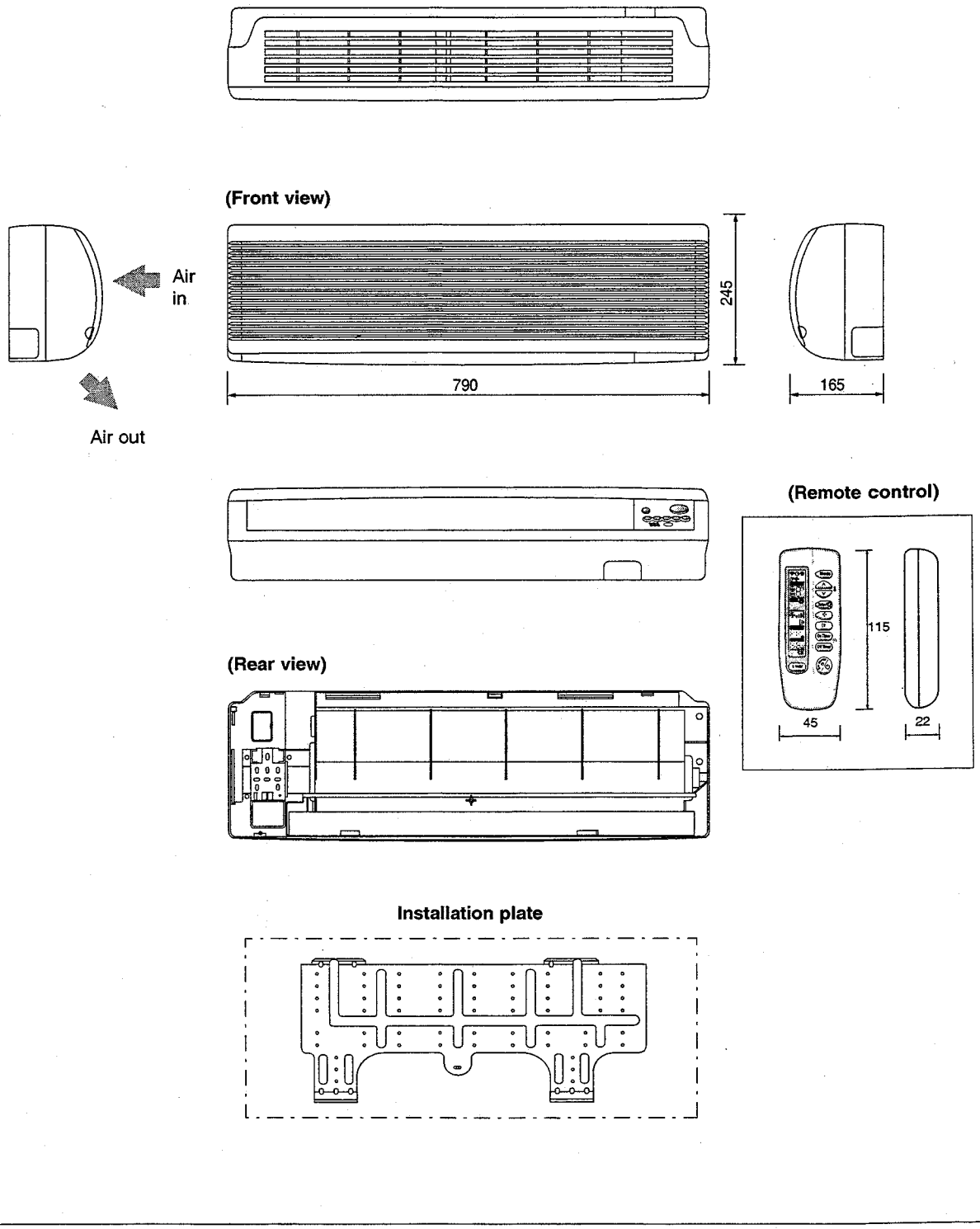


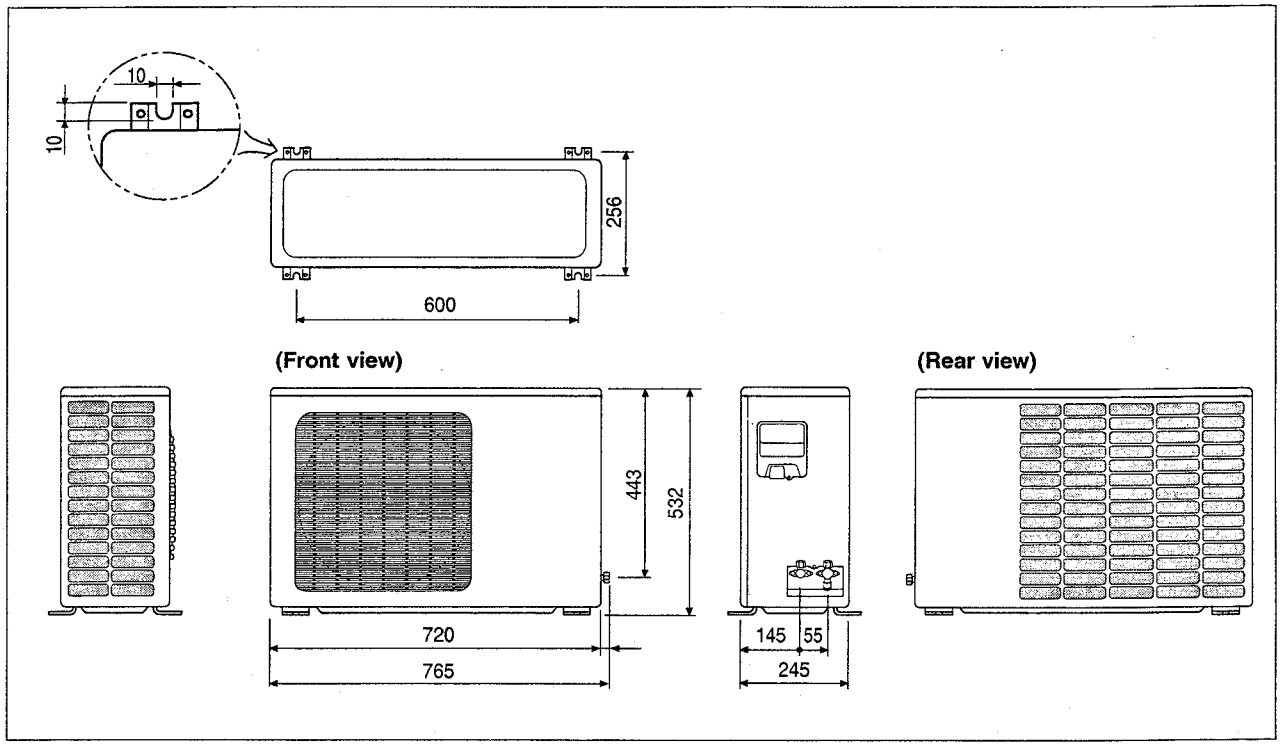
Fig. 1-4 Clean the Unit

2-2 Dimensions

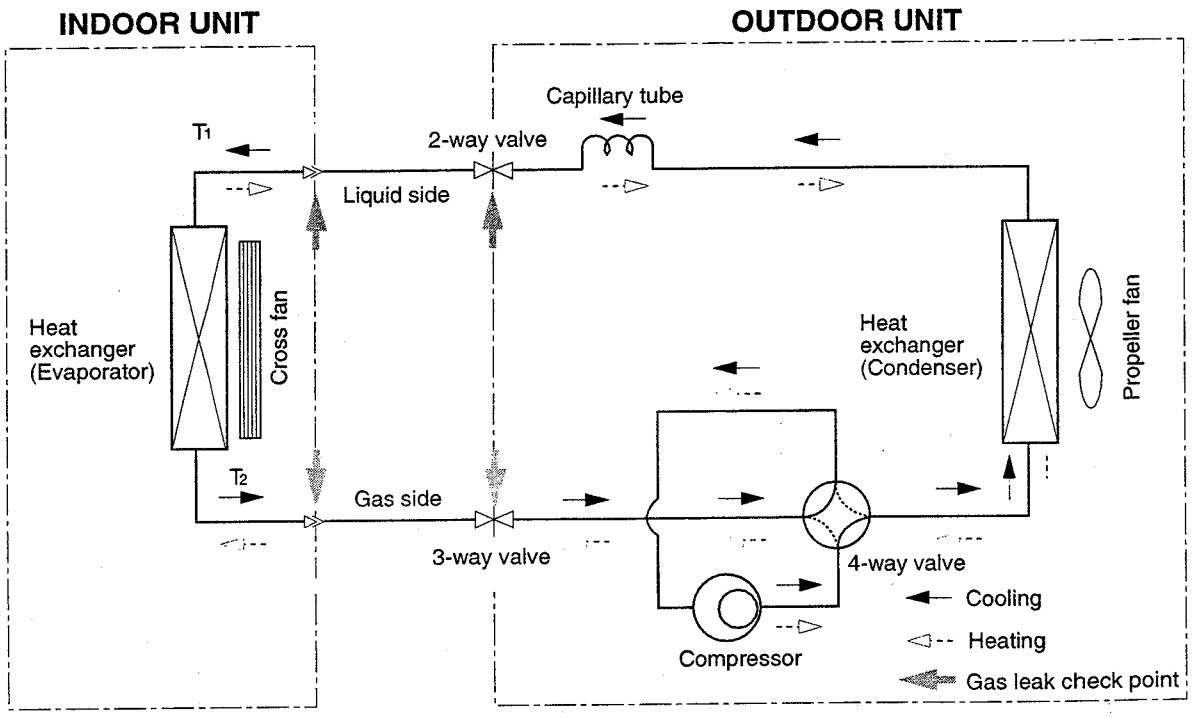
2-2-1 Indoor Unit



2-2-2 Outdoor Unit



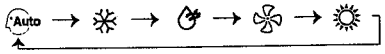
2-3 Refrigerating Cycle Block Diagram



3. Operating Instructions and Installation

3-1 Operating Instructions

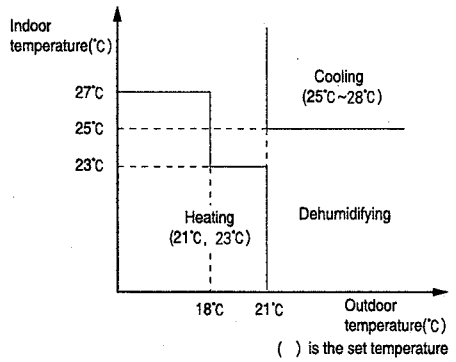
3-1-1 Name & Function of Key in remote controller

NO	FEATURE OF KEY	FUNCTION OF KEY
1		Power On/Off button to start and stop airconditioner or timer set up.
2	(UP)	Temp. up button. To increase the temperature by the pressing the temperature button.
	(DOWN)	Temp. down button. To decrease the temperature by the pressing the temperature button.
3		Each time you press this button, MODE is changed in the following order.  : Auto Mode : Fan Only : Cool Mode : Heat Mode : Dry Mode
4		Press TURBO until the appearance. the air conditioner cools or heats the room as quickly as possible. After 30minutes, the airconditioner is reset automatically to the previous mode.
		Press until the appearance. the sleep timer can be used when you are cooling or heating your room to switch the air conditioner off automatically after a period of six hours.
5		Each time you press this button, FAN SPEED is changed in the following order.
6		Adjust air flow vertically.
7		The ON Timer enables you to **switch on** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel, press the (Set/Cancel) button.
8		The Off Timer enables you to **switch off** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel, press the (Set/Cancel) button.
9		To select the 5 way function with the remote control, press the (5 way) button one or more times until the desired mode is selected. Each time you press the (5 way) button, each 5 way indicator on the indoor unit lights up in order.

3-1-2 Name & Function

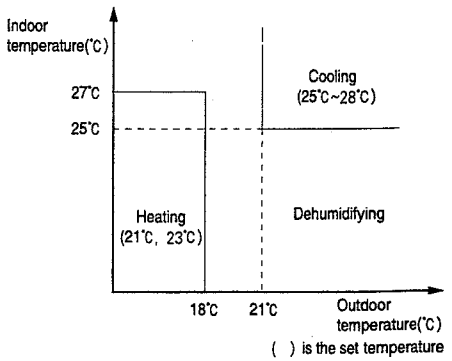
1. AUTO CHANGEOVER FUNCTION :
   *To operate in the "Auto change over" mode, set the MODE on "AUTO".
   *According to the outdoor and indoor temperatures while starting the operation, one of the modes from the cooling, dehumidifying and heating is selected automatically to operate.
   *The operation mode shall be set again if the other condition different from that of the operating conditions(cooling, heating, dehumidifying mode) is kept for 60 minutes during the change-over operation.

   1) Mode selection for operation start



Outdoor temperature	Indoor temperature	Operation type	Set temperature	Wind volume
21℃ over	31℃ over 29℃ over 31℃ less 27℃ over 29℃ less 25℃ over 27℃ less	Cooling	28℃ 27℃ 26℃ 25℃	Automatic
21℃ over	25℃ less	Dehumid-fying	to be set automatically by controller according to the indoor temperature at the operation start.	
18℃ over 21℃ less	23℃ over			
18℃ less	27℃ over			
18℃ over 21℃ less	23℃ less	Heating	to be set automatically by controller according to the indoor temperature at the operation start.	
18℃ less	27℃ less			
			23℃ 21℃	

   2) Mode selection during the operation



Outdoor temperature	Indoor temperature	Operation type	Set temperature	Wind volume
21℃ over	31℃ over 29℃ over 31℃ less 27℃ over 29℃ less 25℃ over 27℃ less	Cooling	28℃ 27℃ 26℃ 25℃	Automatic
21℃ over	25℃ less	Dehumid-fying	to be set automatically by controller according to the indoor temperature at the operation start.	
18℃ over 21℃ less	All area			
18℃ less	27℃ over			
18℃ less	21℃ over 23℃ less 21℃ less	Heating	23℃ 21℃	

2. COOL MODE : The unit operates according to the difference between the setting and room temperature.(setting Temp.: 18°C~30°C)

3. HEAT MODE : The unit operates according to the difference between the setting and room temperature.(setting Temp.: 16°C~30°C)
   *Prevention against cold wind : For about 3~5 minutes after initial operation (thermo control or "de-ice"), the indoor fan will either not operate or operate very slowly, then switch to the selected fan speed. This period is to allow the indoor unit's heat-exchanger to prewarm until emitting warm air.

*High temperature release function : The outdoor unit and compressor ON/OFF is controlled for safety operation when heat exchanger of indoor unit is over heated.
*De-ice : Deicing operation is controlled by outdoor unit's heat exchanger temperature and accumulating time of compressor's operation.
De-ice ends by sensing of the processing time by de-ice Condition.

4. DRY MODE :
*According to the difference between the set temperature (Ts) and indoor temperature (Tr), the operation frequency of compressor is controlled as each area.
(Cooling area/COMP^{or} ON/OFF area/Monitoring area)
→ Cooling area : same as the cool mode
→ COMP^{or} ON/OFF area : repeat of COMP^{or} frequency 36[Hz] for 4 minutes operation/0[Hz](off) for 6 minutes
→ Monitoring area : COMP^{or} off.

5. TURBO MODE : This mode is available in AUTO, COOL, HEAT, DRY, FAN MODE.
When this button is pressed at first, the air conditioner is operated in "powerful" state for 30 minutes regardless of the set temperature, room temperature.
When this button is pressed again, or when the operating time is 30 minutes, turbo operation mode is canceled and returned to the previous mode.
*But, if you press the TURBO button in DRY or FAN mode, it is changed into AUTO mode automatically.

6. SLEEP MODE : Sleep mode is available only in COOL or HEAT mode.
The operation will stop after 6 hours.
*In COOL mode : The setting temperature is automatically raised by 1°C each 1hour When the temperature has been raised by total of 2°C, that temperature is maintained.
*In HEAT mode : The setting temperature is automatically droped by 1°C each 1hour. When the temperature has been droped by total of 2°C, that temperature is maintained.

7. FAN SPEED : Manual (3 step), Auto (4 step)
Fan speed automatically varies depending on the difference between setting and the room temperature.

8. COMPULSORY OPERATION :
For operating the air conditioner without the remote controller, the tact key in indoor unit can be used.
When started with this key, the mode is set on "AUTO".
The operating is the same function as AUTO MODE in the remote controller.
Each time you press this key, 5WAY function is changed in the following order;
STD(standard) → NATURE → POWER(High-speed) → Saving(Power-Saving) → SILENCE
※ STD(standard)( ) : General operation Mode
※ NATURE( ) : The unit is operated according to health pattern control
※ POWER( ) : The unit is operated in powerful state
※ SAVING( ) : The unit is operated in power saving state
※ SILENCE( ) : The unit is operated quitely
Each mode has Auto(Cool or Heat) operation designed in advance.

9. SWING : BLADE-H is rotated vertically by the stepping motor.
   *Memory louver : When ON/OFF button is pressed at stop state, the BLADE-H returns to its original location which is operating state before stop.
   *Swing Set : Press the button under the remote control is displayed on LCD the and the blades move up and down. If the one more time press the button, blade location is stop.

10. 24-Hour ON/OFF Real Setting Timer. : The air conditioner is turned ON at a specified time using (On Timer).
    OFF TIMER : The air Conditioner is turned OFF at a specified time using (Off Timer).
    *ON TIMER : Only timer LED lights on.
    *OFF TIMER : Both timer and operation LED lights on.

11. SELF Diagnosis

Indoor unit

LAMP of Display Monitor						Description
TIMER	STD	NATURE	POWER	SAVING	SILENCE	● : Lamp on ◎ : Lamp flickering X : Lamp off
◎	X	X	X	X	X	Indoor unit room temperature sensor error(open or short)
◎	◎	X	X	X	X	Indoor unit heat exchanger temperature sensor error(open or short)
X	X	◎	X	X	X	Indoor fan motor mal function
◎	◎	◎	X	X	◎	EEPROM error
◎	◎	◎	◎	◎	◎	option error
X	◎	◎	X	X	X	Outdoor unit temperature sensor error (open or short) - outdoor temp-sensor - deice temp-sensor - OLP temp-sensor - discharge temp-sensor - heatsink temp-sensor
◎	X	◎	X	X	X	Abnormal communication (Indoor - Outdoor unit)
X	X	X	◎	X	X	Abnormal increase of operation current
X	X	◎	◎	X	X	Abnormal increase of discharge and OLP temperature
◎	X	X	◎	X	X	Over current of IPM circuit
X	◎	◎	◎	X	X	Trouble of the PTC circuit of the outdoor
◎	X	◎	◎	X	X	Trouble of AC current sensor(open/short) and Leakage of refrigerant(R-22)

Outdoor unit

LAMP of inverter PBA			Description ● : Lamp on ◎ : Lamp flickering X : Lamp off
Yellow	Blue	Red	
X	◎	●	Normal operation and communication (Indoor-Outdoor unit)
X	X	●	Abnormal communication (Indoor-Outdoor unit)
X	X	X	Trouble of the control power of the outdoor
X	●	X	Abnormal communication (Sub-Main micom)
●	●	◎	No zero-crossing signal
●	X	◎	Trouble of option setting
◎	X	●	Abnormal increase of discharge temperature
◎	●	●	Abnormal increase of OLP temperature
◎	●	X	Abnormal increase of operation current
X	X	◎	Over current of IPM circuit
X	●	◎	Over voltage of IPM circuit
●	◎	●	Over voltage and current of PFC circuit
●	◎	◎	Trouble of DC link voltage circuit
◎	◎	X	Trouble of discharge temp-sensor (open/short)
◎	X	◎	Trouble of outdoor temp-sensor (open/short)
◎	●	◎	Trouble of de-ice temp-sensor (open/short)
◎	◎	◎	Trouble of OLP temp-sensor (open/short)
◎	◎	●	Trouble of AC current sensor (open/short) and Leakage of refrigerant(R-22)

12. BUZZER SOUND : Whenever the ON/OFF button is pressed or whenever change occurs to the condition which is set up or select, the compulsory operation mode, buzzer is sounded "beep".

3-2 Installation

3-2-1 Selecting Area for Installation

Select an area for installation that is suitable to the customer's needs.

3-2-1(a) Indoor Unit

1. Make sure that you install the indoor unit in an area providing good ventilation. It must not be blocked by an obstacle affecting the airflow near the air inlet and the air outlet.
2. Make sure that you install the indoor unit in an area allowing good air handling and endurance of vibration of the indoor unit.
3. Make sure that you install the indoor unit in an area where there is no source of heat or vapor nearby.
4. Make sure that you install the indoor unit in an area from which hot or cool air is spread evenly in a room.
5. Make sure that you install the indoor unit in an area away from TVs, audio units, cordless phones, fluorescent lighting fixtures and other electrical appliances (at least 1 meter).
6. Make sure that you install the indoor unit in an area which provides easy pipe connection with the outdoor unit, and easy drainage for condensed water.
7. Make sure that you install the indoor unit in an area which is large enough to accomodate the measurements shown in figure on the next page.

3-2-1(b) Outdoor Unit

1. Make sure that you install the outdoor unit in area not exposed to the rain or direct sun light.
   (Install a separate sunblind if exposed to direct sun light.)
2. Make sure that you install the outdoor unit in area allowing good air moment, not amplifying noise or vibration, especially to avoid disturbing neighbours.
   (Fix the unit firmly if it is mounted in a high place.)
3. Make sure that you install the outdoor unit in area providing good ventilation and which is not dusty. It must not be blocked by any obstacle affecting the airflow near the air inlet and the air outlet.
4. Make sure that you install the outdoor unit in area free from animals or plants.
5. Make sure that you install the outdoor unit in area not blocking the traffic.
6. Make sure that you install the outdoor unit in area easy to drain condensed water from the indoor unit.
7. Make sure that you install the outdoor unit in area which provides easy connection within the maximum allowable length of a coolant pipe(15 meters).

Note

1. Add 20 grams of refrigerant (R-22) for every 1 meter if the pipe length exceeds the standard pipe length of 5 meters.
2. Maintain a height between the indoor and outdoor units.

8. Make sure that you install the outdoor unit in an area which is large enough to accommodate the measurements.

3-2-1(c) Remote Control Unit

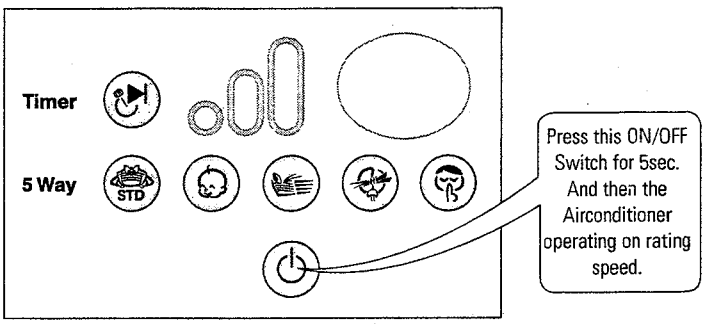
1. Make sure that you install the remote control unit in an area free from obstacles such as curtains etc, which may block signals from the remote control unit.
2. Make sure that you install the remote control unit in an area not exposed to direct sunlight, and where there is no source of heat.
3. Make sure that you install the remote control unit in an area away from TVs, audio units, cordless phones, fluorescent lighting fixtures and other electrical appliances (at least 1 meter).

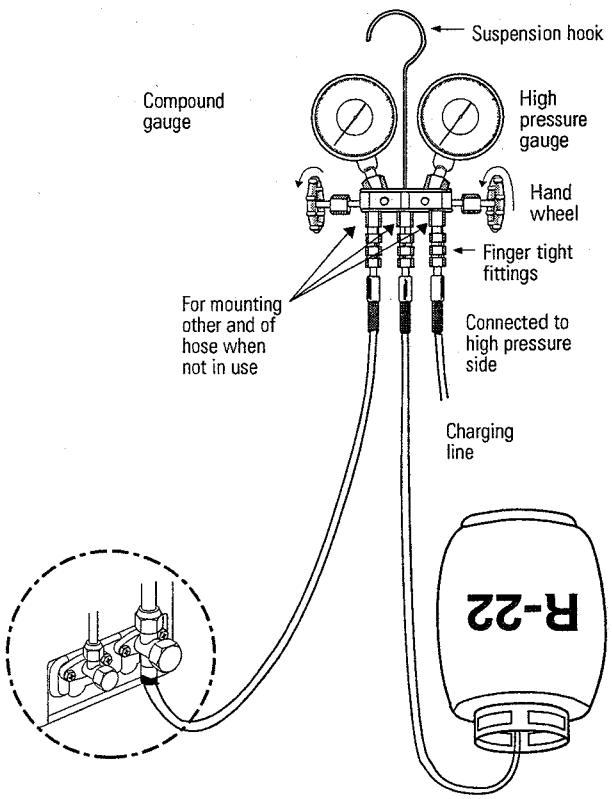
Caution :
It is harmful to the air conditioner if it is used in the following environments: greasy areas (including areas near machines), salty areas such as coast areas, areas where sulfuric gas is present such as hot spring areas. Contact your dealer for advice.

3-2-2(a) Refrigerant Refill

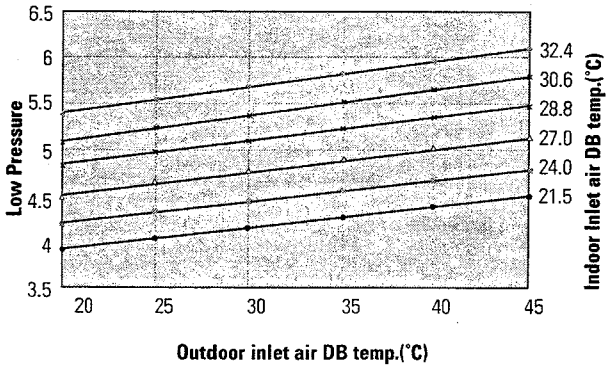
• Refill an air-conditioner with refrigerant when refrigerant has been leaked at installing or using.

1. Purge air(for new installation only).
2. Turn the 3-way valve clockwise to close, connect the pressure gauge(low pressure side) to the service valve, and open the 3-way valve again.
3. Connect the tank to refill with Refrigerant
4. Set the unit to Low pressure checking mode.
   * Press the ON/OFF switch for 5 second.
   *All lamps blink on the indoor unit.
5. Check the pressure indicated by the pressure gauge(low pressure side).
   * Refer to Low pressure graph.
6. Open the refrigerant tank and fill with refrigerant until the rated pressure is reached.
   * It is recommended not to pour the refrigerant in too quickly, but gradually while operating a pressure valve.
7. Stop operation of the air conditioner.
8. Close the 3-way valve, disconnect the pressure gauge, and open the 3-way valve again.
9. Close the cap of each valve.

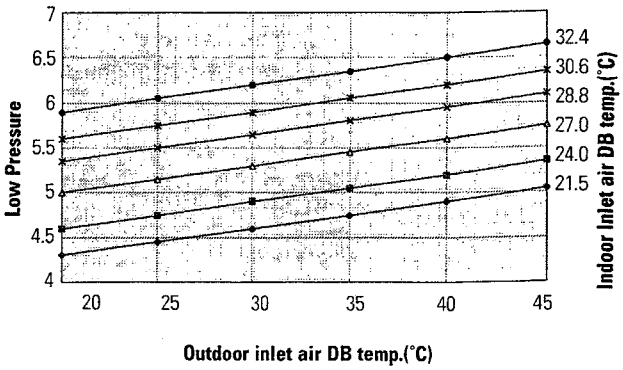




• MODEL NAME : AQV12ACME(UQV12ACME)
AQV12ADME(UQV12ADME)
AQV12BCME(UQV12BCME)
AQV12BDME(UQV12BDME)
SH12VAC(SH12VACX)
SH12VAD(SH12VADX)



• MODEL NAME : AQV09ACME(UQV09ACME)
AQV09ADME(UQV09ADME)
AQV09BCME(UQV09BCME)
AQV09BDME(UQV09BDME)
SH09VAC(SH09VACX)
SH09VAD(SH09VADX)



3-2-2(b) Refrigerant Adjustment

Class	For installation		For service	
Connection Pipe Length	Air-Purge Method	Refrigerant Adjustment	Air-Purge Method	Refrigerant Quantity
5m (standard)	Refer to the detailed Air-Purge Procedure	Unnecessary	Purge air using a vaccum pump or an additional refrigerant cylinder.	refer to specification sheet
6~15m		Add 20g of refrigerant (R-22) for every 1m.		Add 20g of refrigerant (R-22) for every 1m.

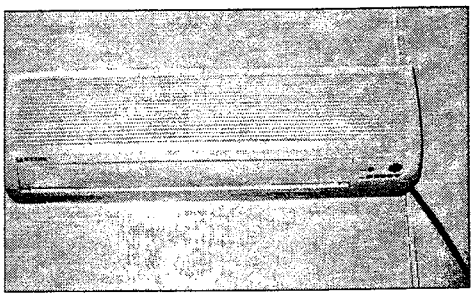
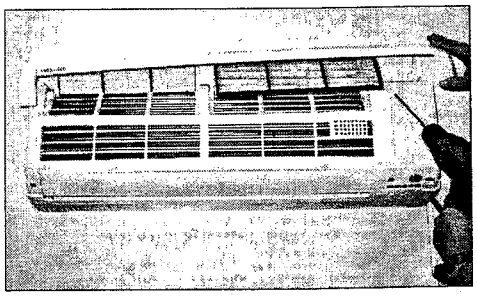
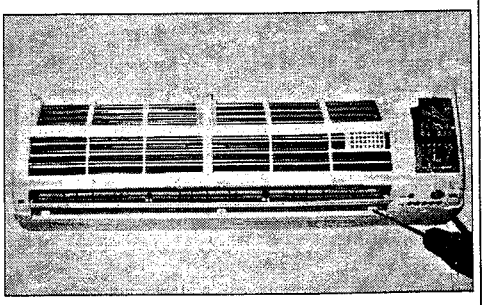
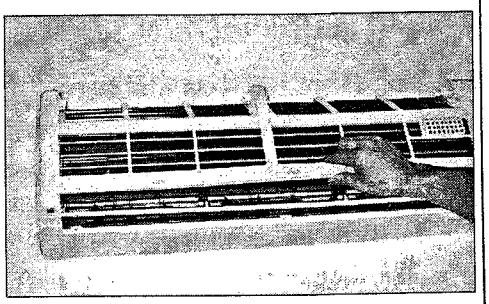
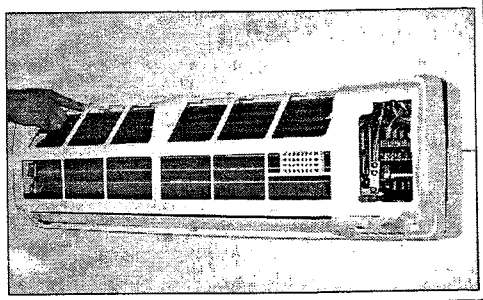
3-2-2(c) Flare unt fixing torque

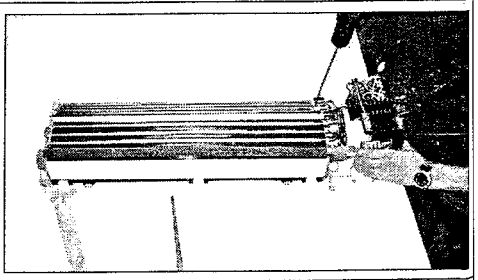
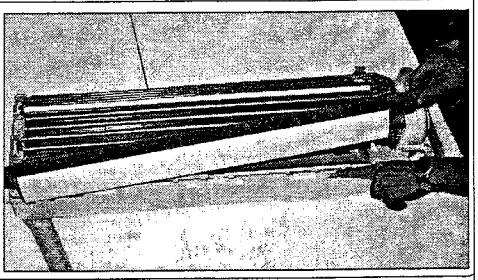
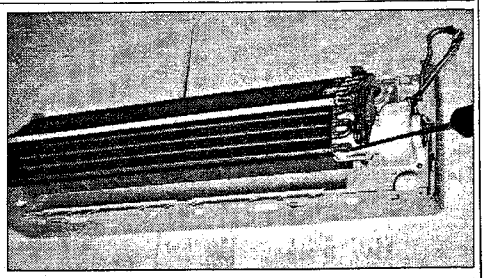
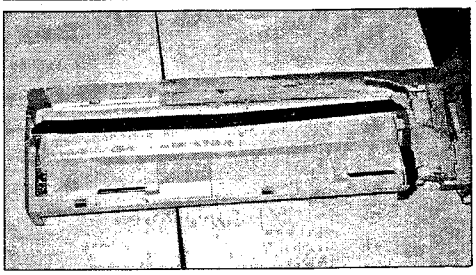
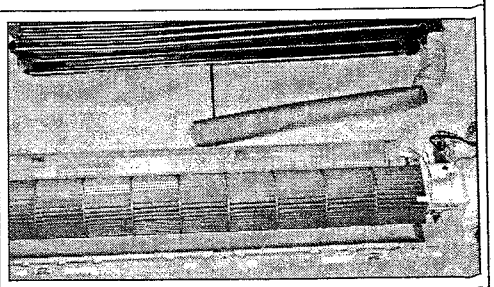
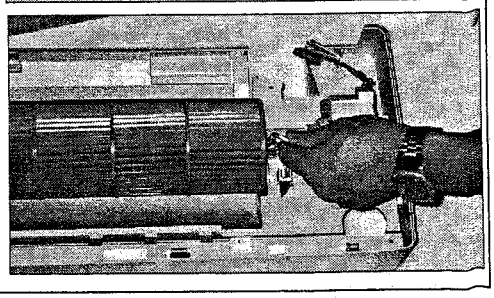
Outter diameter	Torque (kg-cm)	
	Fixing Torque	Final Torque
ø 6.35 (9000Btu, 12000Btu) (Liquid Side)	160	200
ø 9.52 (9000Btu) (Gas Side)	300	350
ø 12.7 (12000Btu) (Gas Side)	500	550

4. Disassembly and Reassembly

Stop operation of the air conditioner and remove the power cord before repairing the unit.

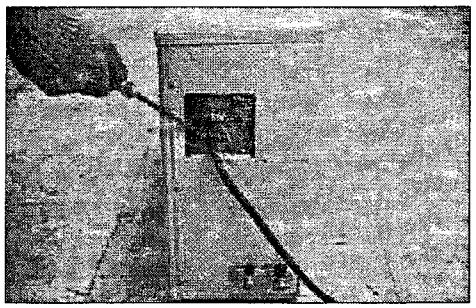
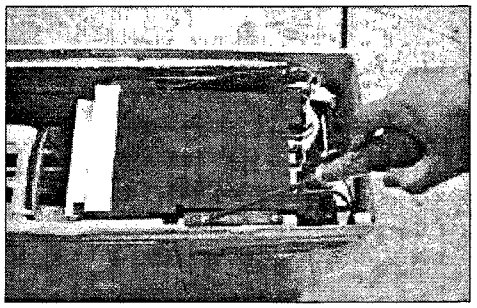
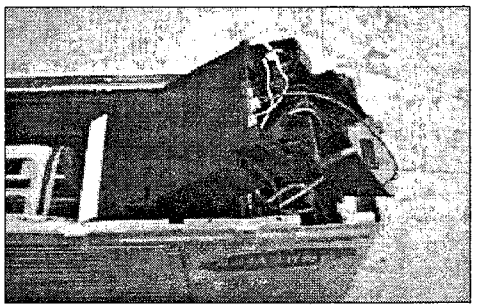
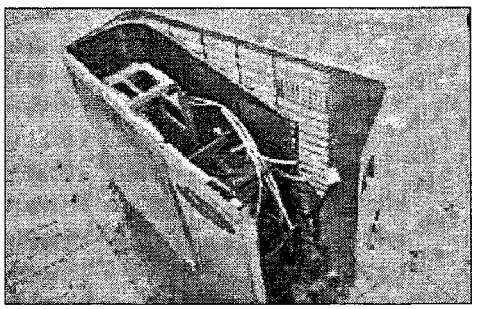
4-1 Indoor Unit

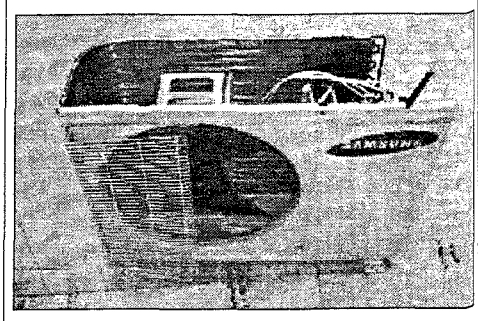
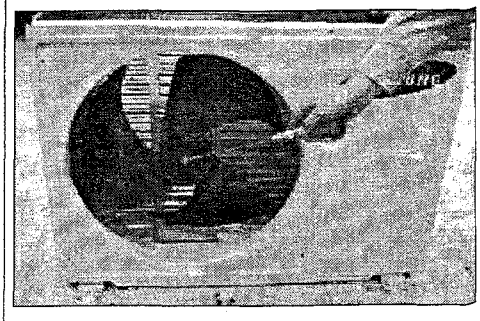
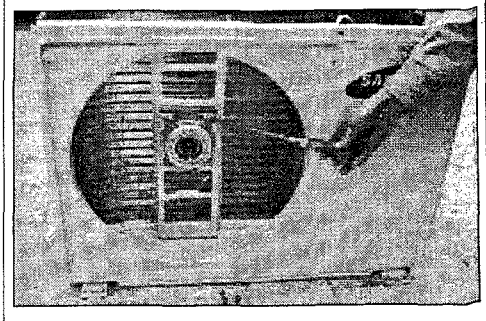
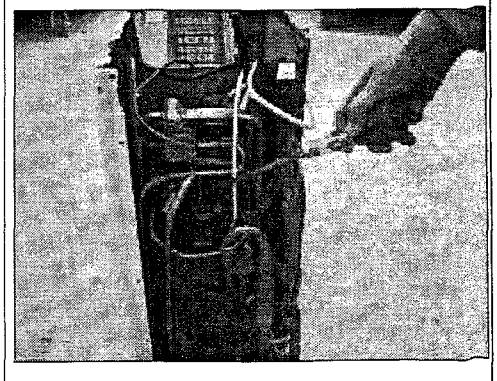
No	Parts	Procedure	Remark
1	Front Grille	1) Stop the air conditioner operation and block the main power. 2) Seperate tape of front panel upper.	
		3) Contract the second finger to the left, and right handle and pull to open the inlet grille. 4) Take the left and right filter out. *Taking off the deodorizing filter. 5) Loosen one of the right fixing screw and seperate the terminal cover. 6) Loosen three fixing screws of front grille.	 
		7) Pull the upper left and right of discharge softly for the outside cover to be pulled out. 8) Pull softly the lower part of discharge and push it up. **Caution;** Assemble the front panel and fix the hooks of left and right.	 

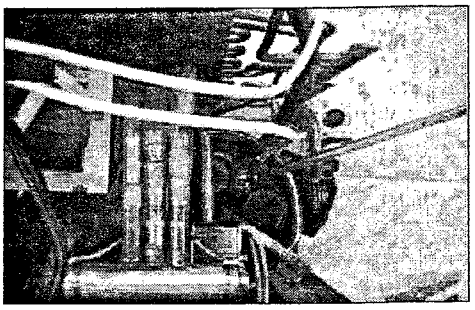
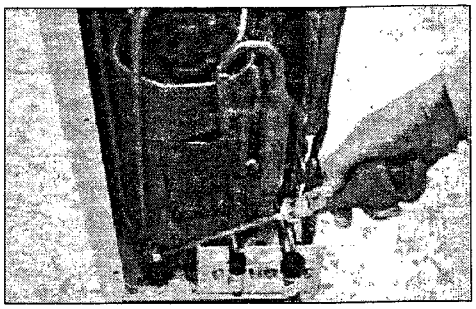
No	Parts	Procedure	Remark
2	Ass'y Tray Drain.	1) Do "1"above 2) Take all the connector of PCB upper side out. (Inclusion Power cord) 3) Separate the outdoor unit connection wire from the terminal block. 4) If pulling the Main PCB up. it will be taken out.	
3	Electrical Parts (Main PCB)	1) Do "1", "2" above Separate the drain hose from the extension drain hose. 2) Pull tray drain out from the back body.	
4	Heat Exchanger	1) Do "1" and "2", "3" above 2) Loosen two fixing earth screws of right side. 3) Separate the connection pipe. 4) Separate the holder pipe at the rearside. 5) Loosen the three fixing screws of right and left side. 6) Lifting the heat exchanger up a little to push the up side for separation from the indoor unit.	 
5	Fan Motor and Cross Fan	1) Do "1", "2", "3", "4" above. 2) Loosen the fixing two screws and separate the motor holder. 3) Loosen the fixing screw of fan motor. (By use of M3 wrench) 4) Separate the fan motor from the fan. 5)Separate the fan from the left holder bearing.	 

4-2 Outdoor Unit

Take care of the electrical shock by contact on the charging parts before the discharge after power off. (If takes approximately 2 minutes to discharge.)

No	Parts	Procedure	Remark
1	Common Work & Ass'y-control Out	1) Loosen the fixing screw and separate the Cover-Valve. 2) Separate the Cable-Connector Wire from the Terminal-Block.	
		3) Loosen five fixing screws and separate the Cabi-Upper. 4) Loosen five fixing screws from the Ass'y-Control Out.	
		5) Separate the Terminal-Housing from the Ass'y-Control Out. 6) Separate the Ass'y-Control Out from the outdoor unit.	
		7) Loosen seven fixing screws and separate the Cabi-Side.	

No	Parts	Procedure	Remark
2	Fan-Motor	1) Loosen Four fixing screw of the Guard-Fan.	
		2) Remove the nut flange (Turn to the right to remove, as it is a left hand screw) 3) Separate the fan.	
		4) Loosen four fixing screws to separate the motor.	
3	Heat Exchanger	1) Do "1" above. 2) Loosen three fixing screws of Ass'y-Frame and Partition. 3) Disassemble the inlet and outlet pipe by welding. 4) Separate the heat exchanger.	

No	Parts	Procedure	Remark
4	Compressor	1) Do "1" above. 2) Open the terminal cover of compressor and unscrew the connection terminal. 3) Disassemble the inlet and outlet pipe of compressor by welding. 4) Disassemble the inlet and outlet pipe of condenser by welding.	
		5) Loosen the three bolts of the lower part. 6) Separate the compressor.	

5. Troubleshooting

Since the inverter air conditioner is equipped with Electrical control circuits at both Indoor & outdoor unit, the trouble shooting shall be performed according to the error mode.
Inside the controller of the outdoor unit (inverter), the large capacity of electrolytic condenser so that it takes the time to discharge after the power off since the electrical charge remains (the charging voltage DC 340V).
Take care of the electrical shock by contact on the charging part before the discharge after the power off. (It takes approximately 2 minutes to discharge).

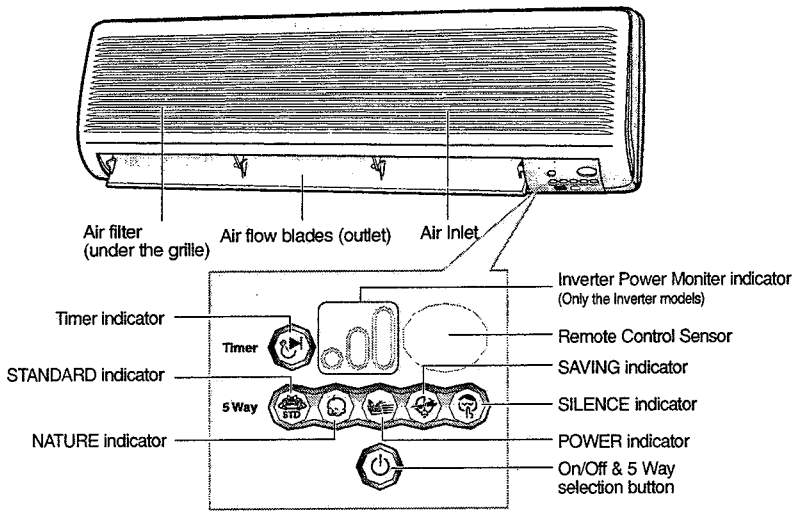
5-1 Basic items for trouble shooting

1) Is the power source proper?
The power source shall be in the range of the rated voltage ±10%. If it is out of this range, it may cause the abnormal operation.
2) Is the connection made between the indoor and outdoor unit?
The connection between indoor and outdoor unit shall be performed with 4 wire. (connection cable of indoor and outdoor unit + ground wire).
3) The phenomena as follows are not out of order.

NO	Phenomena	Cause and reason
1	The operation is not done.	• Is the power off or the power unplugged? • Does it stop because it is the completion time? • Unplug and plug again the power source for 2 minutes.
2	The wind comes out but the heating/cooling is not performed.	• Is the filter clogged with dust or dirty? • Is there any direct light on the outdoor unit or any obstacle against it? • Is the selected temperature too high? Lower the selected temperature lower than the current one (during cooling). • Is the selected temperature too low? Raise the desired temperature than the current one (during heating). • Is the "Fan only Mode" operation?
3	The remote controller does not operate.	• Is the battery run out? • Is the battery inserted in the wrong way(+, -)? • Is the detection part of the indoor unit blocked? • Does it interfered with the radio of neon sign?
4	The wind volume is not adjusted.	• Is the operation selected among one of Auto / Dry / Turbo / Sleeping? • The temperature setting is not required since the wind volume set automatically. • Check again at the state of Cooling / Fan only / Heating.
5	The temperature is not set.	• Is the operation selected among the Dry / Turbo / Sleeping / Fan only Mode. Since the temperature is automatically set, the temperature setting is not required. • Check again at the cooling/heating state. • The standard temperature ±2°C during the automatic operation.
6	The operation lamp continues to be flickering.	• Push the Operation / Stop button. • Unplug and plug the power source.
7	The immediate operation starts without control of remote controller when plugged	• It is the case that the auto restart function works. # Auto restart function is the convenient function where the operation state is memorized in the Memory IC during the blackout and the operation restarts when the power comes back.

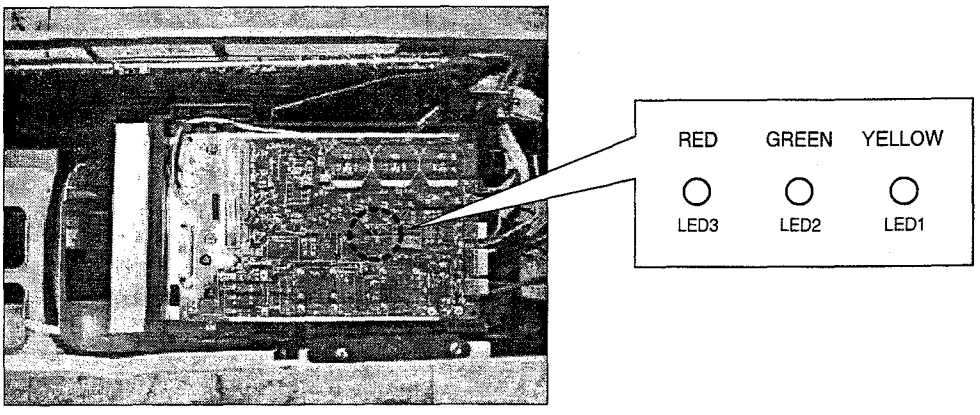
5-2 The first determination method of troubled part

5-2-1 Error mode display of indoor unit



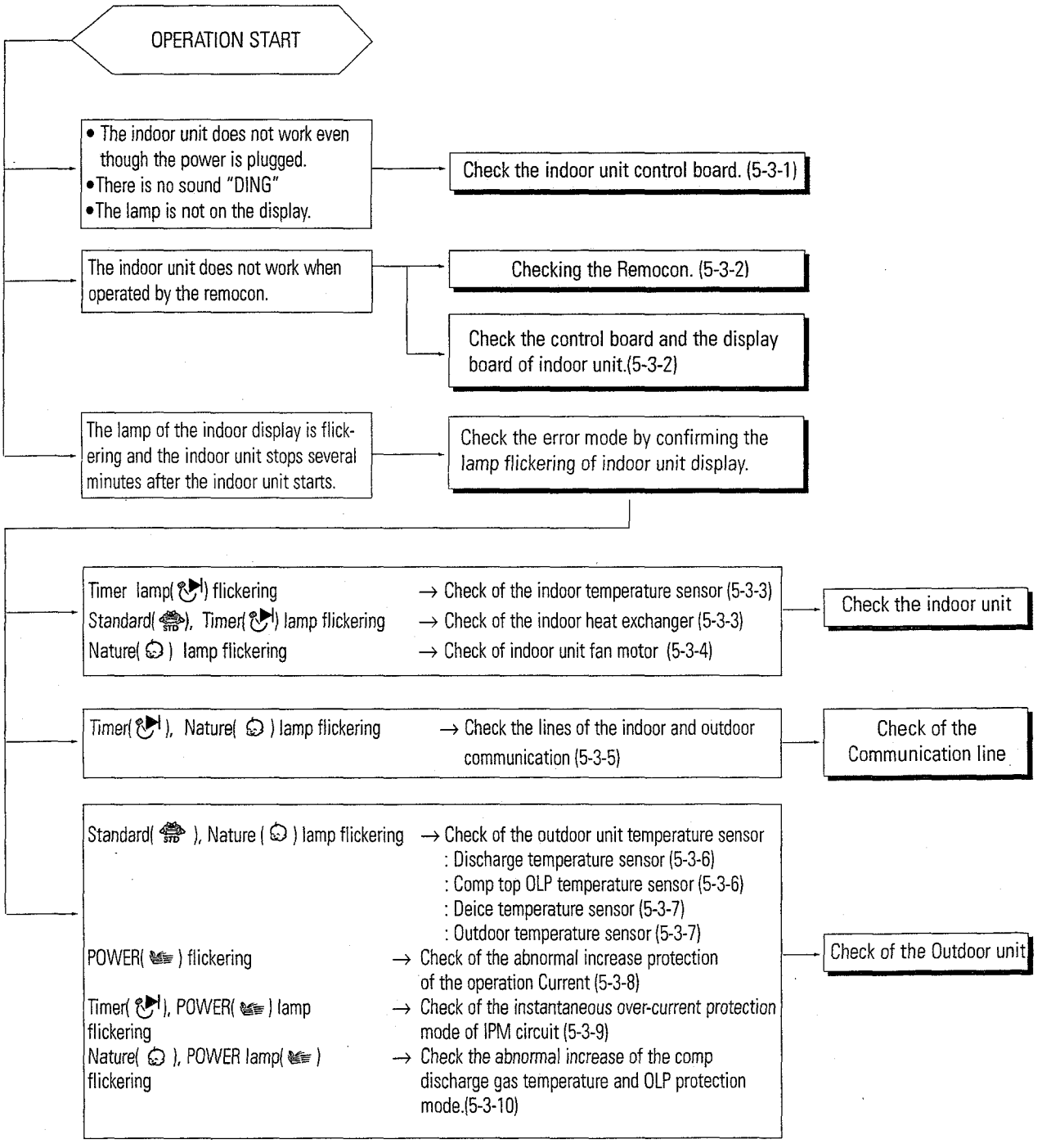
LAMP of Display Monitor						Description
Timer	STD	NATURE	POWER	SAVING	SILENCE	◎ : LAMP ON ● : LAMP FLICKERING X : LAMP OFF
◎	X	X	X	X	X	Indoor unit room temperature sensor error(open or short)
◎	◎	X	X	X	X	Indoor unit heat exchanger temperature sensor error (open or short)
X	X	◎	X	X	X	Indoor fan motor mal function
◎	◎	◎	X	X	◎	EEPROM error
◎	◎	◎	◎	◎	◎	Option error
X	◎	◎	X	X	X	Outdoor unit temperature sensor error(open or short) - outdoor temp-sensor - deice temp-sensor - OLP temp- sensor - discharge temp-sensor - heatsink temp-sensor
◎	X	◎	X	X	X	Abnormal communication (Indoor - Outdoor unit)
X	X	X	◎	X	X	Abnormal increase of operation current
X	X	◎	◎	X	X	Abnormal increase of discharge and OLP temperature
◎	X	X	◎	X	X	Over current of IPM circuit
X	◎	◎	◎	X	X	Trouble of the PTC circuit of the outdoor
◎	X	◎	◎	X	X	Trouble of AC current sensor (open/short) and Leakage of refrigerant(R-22)

5-2-2 Error mode display of outdoor unit board



LAMP of inverter PBA			Description ● : LAMP ON ◎ : LAMP FLICKERING X : LAMP OFF
YELLOW	GREEN	RED	
X	◎	●	Normal operation and communication (Indoor-Outdoor unit)
X	X	●	Abnormal communication(Indoor-Outdoor unit)
X	X	X	Trouble of the control power of the outdoor
X	●	X	Abnormal communication (Sub-Main micom)
●	●	◎	No zero-crossing signal
●	X	◎	Trouble of option setting
◎	X	●	Abnormal increase of discharge temperature
◎	●	●	Abnormal increase of OLP temperature
◎	●	X	Abnormal increase of operation current
X	X	◎	Over current of IPM circuit
X	●	◎	Over voltage of IPM circuit
●	◎	●	Over voltage and current of PFC circuit
●	◎	◎	Trouble of DC link voltage circuit
◎	◎	X	Trouble of discharge temp-sensor(open/short)
◎	X	◎	Trouble of outdoor temp-sensor(open/short)
◎	●	◎	Trouble of deice temp-sensor(open/short)
◎	◎	◎	Trouble of OLP temp-sensor(open/short)
◎	◎	●	Trouble of AC current sensor(open/short) and Leakage of refrigerant(R-22)

5-3 Sequence of trouble shooting for inverter aircon


OPERATION START
• The indoor unit does not work even though the power is plugged.
•There is no sound "DING"
•The lamp is not on the display.
Check the indoor unit control board. (5-3-1)
The indoor unit does not work when operated by the remocon.
Checking the Remocon. (5-3-2)
Check the control board and the display board of indoor unit.(5-3-2)
The lamp of the indoor display is flickering and the indoor unit stops several minutes after the indoor unit starts.
Check the error mode by confirming the lamp flickering of indoor unit display.
Timer lamp( ) flickering → Check of the indoor temperature sensor (5-3-3)
Standard( ), Timer( ) lamp flickering → Check of the indoor heat exchanger (5-3-3)
Nature( ) lamp flickering → Check of indoor unit fan motor (5-3-4)
Check the indoor unit
Timer( ), Nature( ) lamp flickering → Check the lines of the indoor and outdoor communication (5-3-5)
Check of the Communication line
Standard( ), Nature ( ) lamp flickering → Check of the outdoor unit temperature sensor
: Discharge temperature sensor (5-3-6)
: Comp top OLP temperature sensor (5-3-6)
: Deice temperature sensor (5-3-7)
: Outdoor temperature sensor (5-3-7)
POWER( ) flickering → Check of the abnormal increase protection of the operation Current (5-3-8)
Timer( ), POWER( ) lamp flickering → Check of the instantaneous over-current protection mode of IPM circuit (5-3-9)
Nature( ), POWER lamp( ) flickering → Check the abnormal increase of the comp discharge gas temperature and OLP protection mode.(5-3-10)
Check of the Outdoor unit

5-3-1 Check of indoor unit control board

▷ Unplug the power cord and plug it after 5 seconds.
▷ Press the on/off switch located in indoor unit inside to operate the air conditioner.
• If the air conditioner operates, check the remocon and indoor unit display board.
• If the air conditioner does not operate, check according to the sequence of the followings:

▷ Check sequence of indoor unit control board
Step 1 : Check whether two wires of power cord (Sky-blue, brown) are connected correctly to the terminal block.
• Sky -blue : connected to "N"
• Brown : connected to "L"
Step 2: Check whether the wire connected to the terminal block is connected correctly to the control board.

(Control board)		(Terminal block)		
JN	SKY-BLU	N	SKY-BLU	(N1)
RY71	BRN	L		
RY71	ORG	1		
JC	BLK	2		

Step 3 : Check whether the fuse (F701)(F702) on the control board is normal. (5 [A]/250[V]:F701) (1[A]/250[V] : F702)
• If the fuse is broken, replace it with the new one.
Step 4 : check the output of SMPS on the control board.
• Input power AC187~AC264V—IC 02 Input: DC 12V
IC 02 Output : DC 5V

5-3-2 Display board and remocon check of indoor unit

▷ Check whether the connection wire of Display board is correctly connected to CN91 connector.
▷ Check the voltage of remocon battery. - the voltage of one battery shall be higher than about 1.4 V, and then the remocon operates normally.
▷ Check whether the neon sign is on and the 3 wave long fluorescent lamp is on around the indoor unit. - After putting all lamps of the indoor out and then operate it by remocon. If it operates with the remocon, it is the abnormality due to the interference from the light of lamps. (Aircon unit is normal).

5-3-3 Check the indoor temperature sensor and indoor heat exchanger temperature sensor.

Take out the thermistor connected to the connector (CN41) of control board of indoor unit and measure the resistance between two wires and if it is same as follows: it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83

5-3-4 Check of indoor unit fan motor

▷ Check whether the wire of fan motor is connected to the connector of control board (CN42, CN71) of indoor unit.
▷ Check whether the error mode displays after the strong revolution for approximately 15 seconds since aircon is on.
→ In case the error mode displays after the fan motor is rotating for 15 seconds → Defect of HALL IC of fan motor and Control board
→ In case that the error mode displays without running of fan motor after 15 seconds. → Operate with the pin of SSR(SS71) short of indoor unit control board and then if the fan motor does not run, it is the fan motor defect.
If it rotates, it is the defect of control board (SS71, IC05, IC04).

5-3-5 Check of communication line between the indoor unit and outdoor unit

(Communication error mode)

1) Check of connection
▷ Check whether the cable wire connecting the indoor unit with outdoor unit is correctly connected to the (N1), 1, 2 terminal. (If the wire is connected reversely, the communication error occurs)
▷ If the cable connecting the indoor unit and outdoor unit is longer than 20m, error mode occurs (shorten the cable length).

(Check of indoor unit)

▷ Check whether the connection wire of the terminal block and control board of indoor unit is correct.

(Control board)		(Terminal block)		
JN	SKY-BLU	N	SKY-BLU	(N1)
RY71	BRN	L		
RY71	ORG	1		
JC	BLK	2		

(Check of outdoor unit)

▷ Check whether the connection wire of the terminal block and control board of outdoor unit is correct.

(Control board)		(Terminal block)
#1 of CN31	BLK	2
N	SKY-BLU	(N1)
L	BRN	1

2) Check of power supply to the outdoor unit
After operation of aircon, select the turbo mode and approximately 3minutes later, check whether the red color lamp of control board (to be seen if the top cover of outdoor unit) is on.
→ If the red lamp (LED 3) is not on, check the power part of control board of outdoor unit.
♦Check the connection of reactor.
→ If the red lamp (LED3) is on and green lamp is flickering, it is normal.

5-3-6 Check of discharge temperature sensor and comp top OLP temperature sensor.

▷ Connector of outdoor unit control board
(PIN#3,4 of CN51 - discharge temperature sensor), (PIN#1,2 of CN52-OLP Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace.

Ambient temperature (°C)	0°C	10°C	20°C	30°C	40°C	50°C
Resistance of thermistor [KΩ]	553	362	242	166	165	82

5-3-7 Check the deice temperature sensor and outdoor temperature sensor

▷ Connector of outdoor unit control board
(PIN#1,2 of CN51 - outdoor temperature sensor),(PIN#3,4 of CN52-deice Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83

5-3-8 Check of operation current abnormal increase mode

▷ The operation abnormal current mode is the protection control for the safe operation by detecting the operation current of inverter aircon by the current sensor on the control board.
▷ If the operation current abnormal increase occurs,
- ♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 °C)
  → Reinstall the outdoor unit so that the good ventilation can be made.
- ♦ If the Refrigerant is overcharged.
  → Check the amount of Refrigerant.
- ♦ If the comp is locked.
  → Replace the comp.
- ♦ If the comp is operating without the revolution of fan motor.
  → Check the fan motor connector, replace the fan motor.
- ♦ If the protection cover is operating with bending to the outdoor.
  → Take out the protection cover.
- ♦ If two outdoor units are operating face to face. (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- ♦ The air circulation is bad due to the attachment of falling leaves
  → Take away the leaves for the good ventilation.

5-3-9 Check of instantaneous over-current protection of IPM circuit.

▷ Inverter instantaneous over-current protection mode is the mode to be actuated in order to prevent the damage of elements from the peak current of IPM circuit elements.
▷ In case that the inverter circuit instantaneous over-current protection mode actuates, check the following items.

(Condition of installation)

♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
→ Reinstall the outdoor unit so that the good ventilation can be made.
♦ In case that the operation is made with the cover bent of the outdoor unit.
→ Take out the cover.
♦ If two outdoor units are operating face to face, (the bad ventilation is made)
→ Reinstall the outdoor unit for the good ventilation.
♦ The air circulation is bad due to the attachment of falling leaves.
→ Take away the leaves for the good ventilation.
♦ If the Refrigerant is overcharged.
→ Check the amount of Refrigerant.

(Unit defect)

♦ If the comp is locked.
→ Replace the comp.
♦ If the comp is operating without the revolution of fan motor.
→ Check the fan motor connector and replace the fan motor.
♦ In case the parts of the control board is damaged.
→ Replace simultaneously the inverter control board.

5-3-10 Check of the comp discharge gas temperature and OLP temperature abnormal rise.

▷ If the comp discharge gas temperature and OLP temperature rises higher than a certain level, it protects the circuit.
▷ If the comp discharge gas temperature and OLP temperature rises abnormally, check the following items.

(Condition of installation)

♦ The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
→ Reinstall the outdoor unit so that the good ventilation can be made.
♦ In case that the operation is made with the cover bent of the outdoor unit.
→ Take out the cover.
♦ If two outdoor units are operating face to face, (the bad ventilation is made)
→ Reinstall the outdoor unit for the good ventilation.
♦ The air circulation is bad due to the attachment of falling leaves
→ Take away the leaves for the good ventilation.
♦ If the refrigerant is insufficient.
→ Fill up the amount of refrigerant.

(Unit defect)

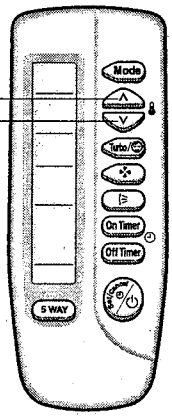
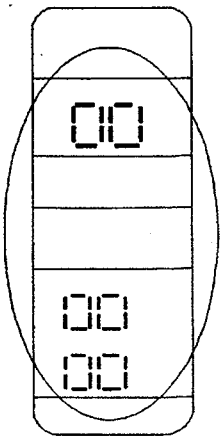
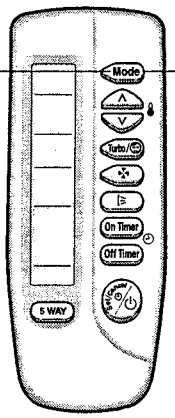
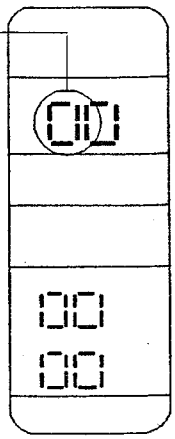
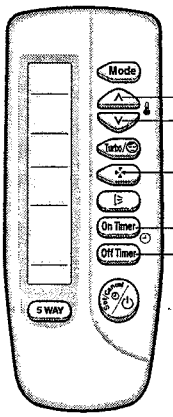
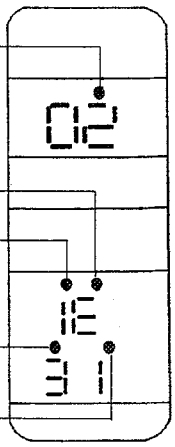
♦ If the comp is locked.
→ Replace the comp.
♦ If the comp is operating without the revolution of fan motor
→ Take out the protection cover.
→ Check the fan motor connector and replace the fan motor.

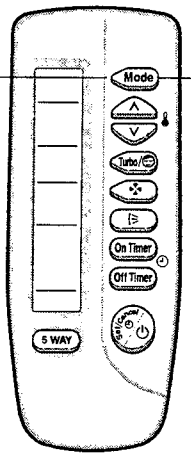
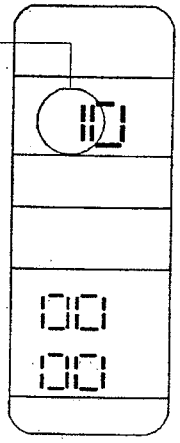
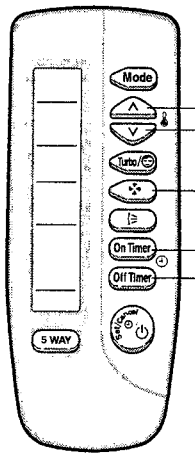
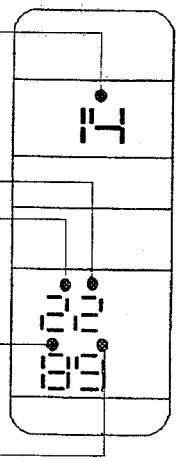
5-4 Fault Diagnosis of Major Parts

<table>
<tr><th>Parts</th><th colspan="2">Diagnosis</th></tr>
<tr><td rowspan="2">◆ Indoor "Temp.Sensor"
◆ Indoor "Heat ex. Sensor"
◆ Outdoor "Temp.Sensor"
◆ Outdoor "Deice Temp. Sensor"</td><td colspan="2">Measure resistance with a tester.</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>15°C</td><td>20°C</td><td>25°C</td><td>30°C</td><td>35°C</td><td>40°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>14.68</td><td>12.09</td><td>10</td><td>8.31</td><td>6.94</td><td>5.83</td></tr>
</table>
</td></tr>
<tr><td></td><td>Abnormal</td><td>∞, 0 Ω ... open or short</td></tr>
<tr><td rowspan="2">◆ Outdoor "Discharge Temp.Sensor"
◆ Outdoor "OLP Temp.Sensor"</td><td>Normal</td><td>
<table>
<tr><td>Ambient temperature</td><td>0°C</td><td>10°C</td><td>20°C</td><td>30°C</td><td>40°C</td><td>50°C</td></tr>
<tr><td>Resistance of thermistor[KΩ]</td><td>553</td><td>362</td><td>242</td><td>166</td><td>165</td><td>82</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω ... open or short</td></tr>
<tr><td rowspan="5">Indoor Fan Motor</td><td colspan="2">Measure resistance between terminals (CN72) with a tester</td></tr>
<tr><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Voltage</td><td></td></tr>
<tr><td>Red, Blue</td><td>410±10%</td><td>Main</td></tr>
<tr><td>Red, Yellow</td><td>325±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω ... open or short</td></tr>
<tr><td colspan="2">Measure the voltage between ground and signal wire of the fan motor</td></tr>
<tr><td>Normal</td><td>
<table>
<tr><td>between</td><td>Voltage</td></tr>
<tr><td>Gray, Orange</td><td>0.5V~4.5V</td></tr>
<tr><td>Yellow, Orange</td><td>5V</td></tr>
</table>
</td></tr>
<tr><td></td><td>Abnormal</td><td>Abnormal if voltage does not change from 0V to 5V.</td></tr>
<tr><td rowspan="2">Outdoor Fan Motor</td><td>Normal</td><td>At ambient temperature (10°C ~ 30°C)
<table>
<tr><td>between</td><td>Resistance</td><td></td></tr>
<tr><td>Black, Red</td><td>275±10%</td><td>Main</td></tr>
<tr><td>Black, White</td><td>350±10%</td><td>Sub</td></tr>
</table>
</td></tr>
<tr><td></td><td>Abnormal</td><td>∞, 0 Ω ... open or short</td></tr>
<tr><td rowspan="3">Stepping Motor
(UP/DOWN swing motor)</td><td colspan="2">Measure resistance between red wire and each terminal.</td></tr>
<tr><td>Normal</td><td>Approx. 380Ω at ambient temperature (20°C ~30°C)</td></tr>
<tr><td>Abnormal</td><td>∞, 0 Ω ... open or short</td></tr>
</table>

5-5 Set up the Model option

※ If you make the replacement of the ASS'Y CONTROL-IN or MAIN PCB ,
Be sure to be set up the model option as follow the steps

Remote controller operation method as per the step	Applicable key	Display status
1st step Method) ① Remove the battery of remote controller ② Press the temperature raise/down key simultaneously ③ Insert the battery again (Result) If the screen of remocn displays as shown in the right, go to the second step		
2nd step Method) If the first digit of LCD is 0 on the remocon screen, go to the 3rd step. ※ If it is 1, press the mode key once to change to 0 and go to the 3rd step.		
3rd step Method) Press the marked key to input the option number. example) 021E31 Result) Go to 4th step if it displays as shown in the right (The number increases from 1~9, and A, b, C, d, E, F whenever pressing the key.)		

Remote controller operation method as per the step	Applicable key	Display status
4th step Method) After completion of 3rd step, and if the MODE KEY is pressed once, 1. 1~3 steps are saved internally 2. If the first number at the time is "1", it is correct and so go to 5th step ※ If pressing mode key and the first digit becomes 0, the screen of 1~3 steps can be seen.		
5th step Method) Pressing the marked key to input the option number. example) 142285 Result) If it displays as shown in the right go to the 6th step		
6th step Method) When pressing the operation ON/OFF key with the direction of remote controller for set, the sound "Ding, or Diriring is heard and then the input of option is completed. ※ Refer to the right side if the error appears.	ERROR MODE 1. When the lamps of (STANDARD(STD), NATURE(), TIMER()) is flickering → failute of option input After removing the set power cord and insert it again, pressing the operation on/off key to retry and if the condition is same, EPROM is deffcective or misinsertted. So replace the PCB.	2. When all lamps of indoor unit( ) are flickering with the sound of Dididiring, → The current option input is different from that of already input one: Check the option number correctly and if it is correct, press the key once more to input the option. (check correctly) → If the option is not input at the time and all lamps are continuously flickering ; since it is the case that the option number is out of the input range, check the option number again and do again the steps from 1 - 6steps

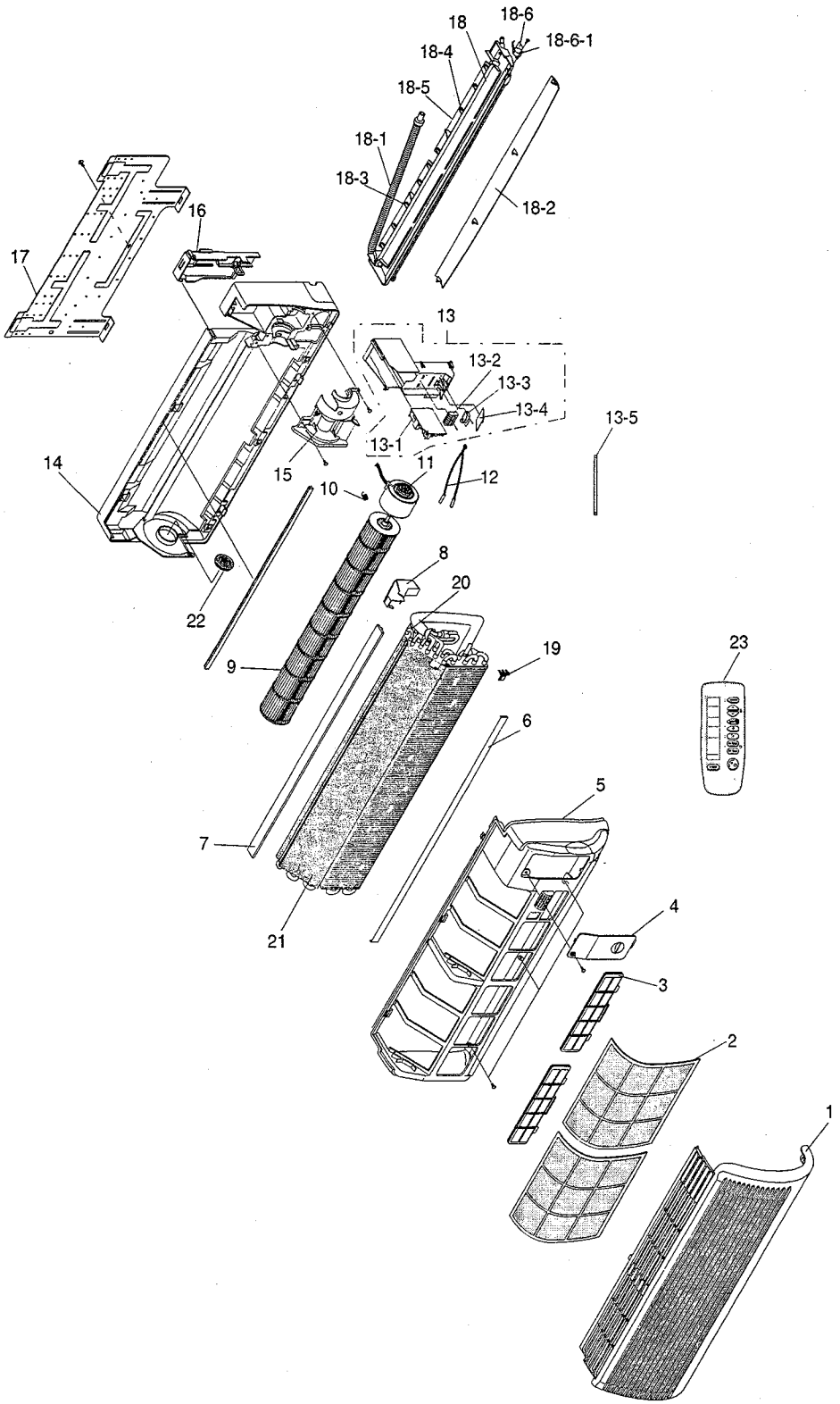
<Table of the option code>

MODEL	OPTION CODE
AQV12ACME AQV12BCME SH12VAC	017315-10123F
AQV09ACME AQV09BCME SH09VAC	017d08-1010Fb
AQV12ADME AQV12BDME SH12VAD	007315-10123F
AQV09ADME AQV09BDME SH09VAD	007d08-1010Fb

MEMO

6. Exploded Views and Parts List

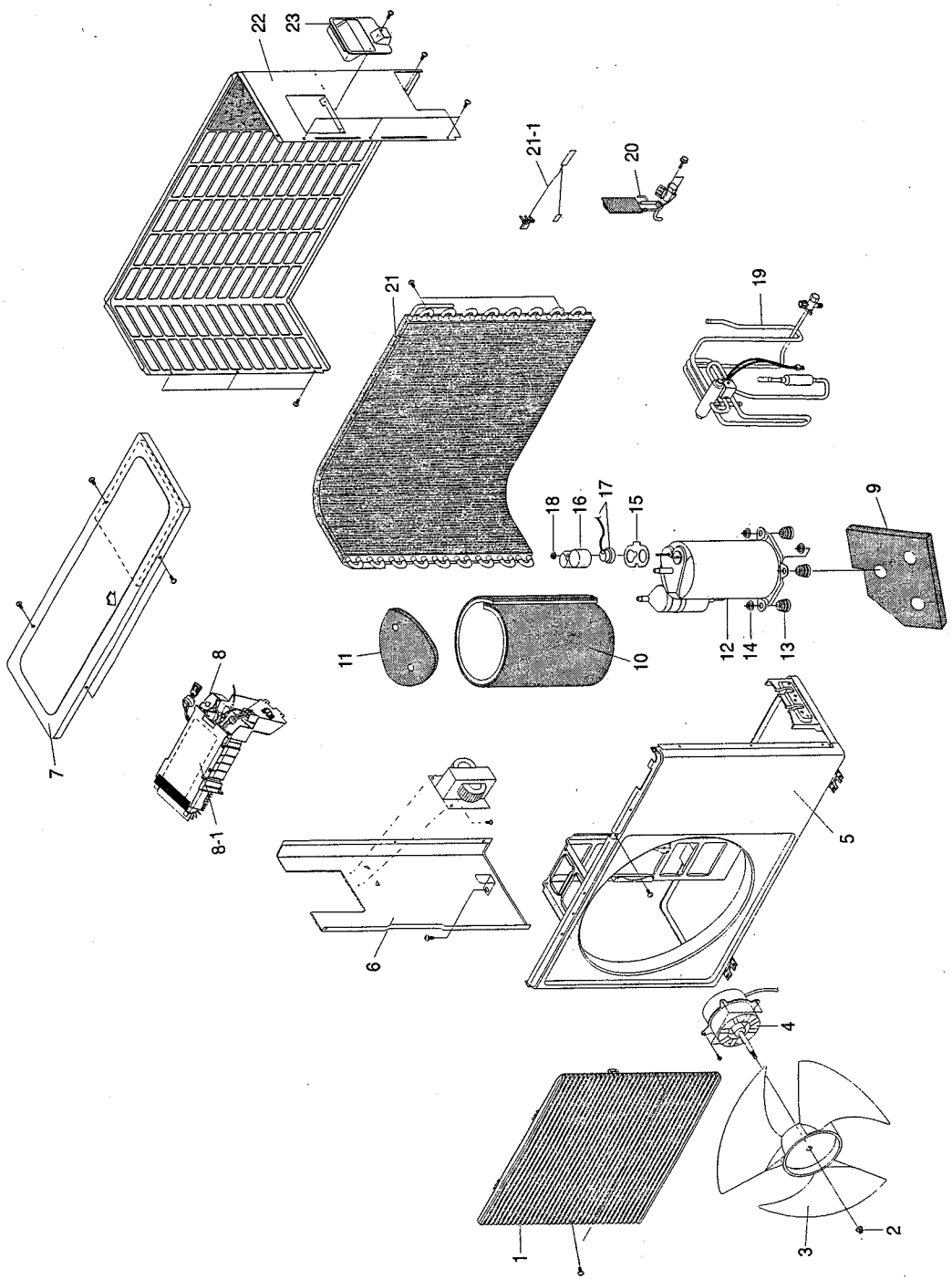
6-1 Indoor Unit



■ Parts List

No.	CODE NO	Description	Q'TY		REMARK
			AQV12ACME / AQV12ADME AQV12BCME / AQV12BDME SH12VAC / SH12VAD	AQV09ACME / AQV09ADME AQV09BCME / AQV09BDME SH09VAC / SH09VAD	
1	DB64-00085A	GRILLE AIR INLET	1	1	
2	DB63-00064A	GUARD-AIR FILTER	2	2	
3	DB74-00011A	FILTER CLEANER ASS'Y	1	1	
4	DB63-00067A	COVER TEMINAL	1	1	
5	DB92-00031G	ASS'Y PANEL FRONT	1	1	
6	DB67-00051A	SPACER EVAP LOW	1	1	
7	DB67-00032A	SPACER EVAP UP	1	1	
8	DB63-00083A	COVER U BEND	1	1	
9	DB94-00040F	ASS'Y FAN CROSS	1	1	
10	DB60-20011A	BOLT SPECIAL	1	1	
11	DB31-00033A	MOTOR FAN IN	1	1	⚠
12	DB32-00020A	THERMISTOR WIRE ASS'Y	1	1	
13	DB93-00960A	ASS'Y CONTROL IN	1	1	⚠
13-1	DB93-00951A	ASS'Y PCB MAIN	1	1	⚠
13-2	DB65-00076A	TERMINAL BLOCK ASS'Y	1	1	⚠
13-3	DB61-00227A	HOLDER WIRE CLAMP	1	1	
13-4	DB93-00969A	ASS'Y PCB DISPLAY	1	1	⚠
13-5	DB39-00606A	CONNECT WIRE PCB	1	1	⚠
14	DB94-00056G	ASS'Y BACK BODY	1	1	
15	DB94-00104A	HOLDER MOTOR	1	1	
16	DB61-00165A	HOLDER PIPE	1	1	
17	DB70-00036A	PLATE HANGER	1	1	
18	DB94-00058F	ASS'Y TRAY DRAIN	1	1	
18-1	DB94-00062E	ASS'Y DRAIN HOSE	1	1	
18-2	DB66-00127B	BLADE H	1	1	
18-3	DB66-00128A	BLADE V,A	3	3	
18-4	DB66-00128B	BLADE V,B	6	6	
18-5	DB63-00082A	SCREEN SAFETY WIRE	1	1	
18-6	DB95-20138A	ASS'Y MOTOR STEPPING	1	1	⚠
18-6-1	DB31-10129A	MOTOR STEPPING; GSP 24RW	1	1	⚠
19	DB61-40251A	HOLDER SENSOR	1	1	
20	DB67-60030A	SPRING SENSOR	1	1	
21	DB98-00717A	EVAPORATOR ASS'Y	1	0	
	DB75-00053A	"	0	1	
22	DB94-40003A	ASS'Y BEARING	1	1	
23	DB93-00251L	ASS'Y REMOCON	1	1	

6-2 Outdoor Unit

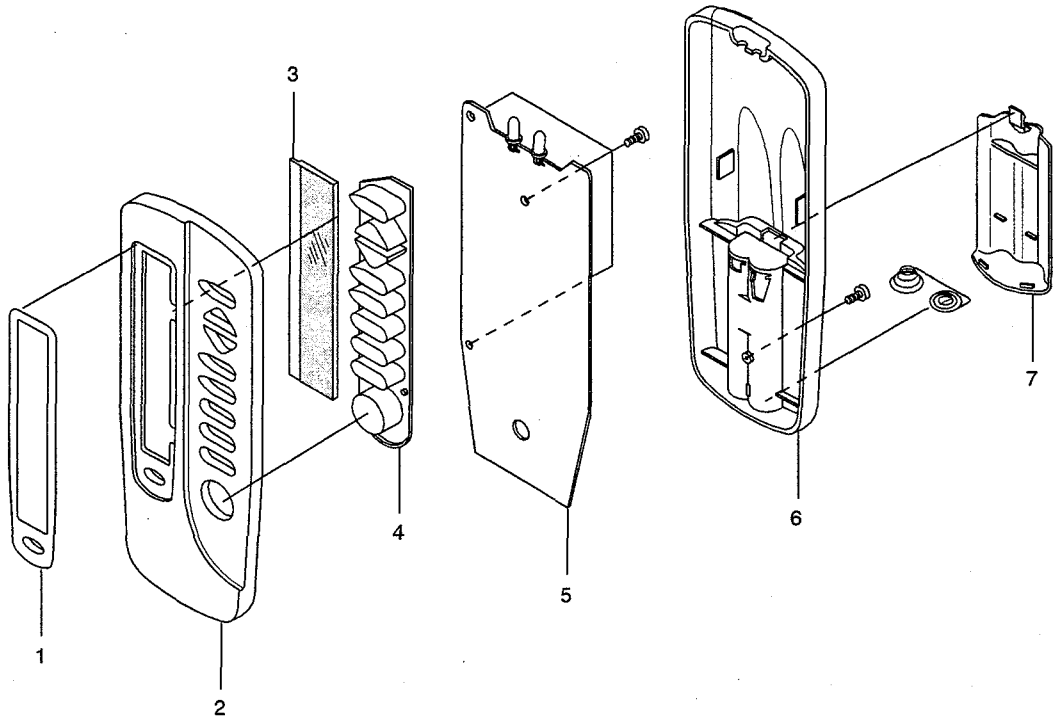


■ Parts List

No.	CODE NO	Description	Specification	Q'TY		REMARK
				AQV12ACME / AQV12ADME AQV12BCME / AQV12BDME SH12VAC / SH12VAD	AQV09ACME / AQV09ADME AQV09BCME / AQV09BDME SH09VAC / SH09VAD	
1	DB63-00104B	GUARD-FAN	HSWR	1	1	
2	DB60-30004A	NUT-FLANGE	2C SM20C M6 NTR	1	1	
3	DB67-50063A	PROPELLER-FAN	AS+G/F,ø405	1	1	
4	DB31-10058E	MOTOR-FAN OUT	AMASS-020WTVB	1	1	
5	DB90-00241P	ASS'Y-FRAME	ASS'Y	1	0	
	DB90-00241N	ASS'Y-FRAME	ASS'Y	0	1	
6	DB94-00160B	ASS'Y-PARTITION	ASS'Y	1	0	
	DB94-00160A	ASS'Y-PARTITION	ASS'Y	0	1	
6-1	DB33-00021A	REACTOR	12A,21mH	1	1	
7	DB90-00627A	CABI-UPPER	SECC-P	1	1	
8	DB93-00962B	ASS'Y-CONTROL OUT	ASS'Y	1	0	
	DB93-00962A	ASS'Y-CONTROL OUT	ASS'Y	0	1	
8-1	DB93-00953B	ASS'Y-MAIN PCB	ASS'Y	1	0	
	DB93-00953A	ASS'Y-MAIN PCB	ASS'Y	0	1	
9	DB63-00380B	FELT COMP BOTTOM	FELT	1	0	
	DB63-00380A	FELT COMP BOTTOM	FELT	0	1	
10	DB72-00211A	CLOTH COMP SIDE	FELT	1	0	
	DB72-00162A	CLOTH COMP SIDE	FELT	0	1	
11	DB72-00658A	CLOTH COMP UPPER	FELT	1	1	
12	48A135RV2EL	COMPRESSOR	48A135RV2EL	1	0	
	44B092QV2EL	COMPRESSOR	44B092QV2EL	0	1	
13	DB73-00070A	GROMMET-ISOLATOR	NR	3	0	
	DB73-00067A	GROMMET-ISOLATOR	NR	0	3	
14	DB60-30029A	NUT-WASHER	HEX 2C MB ZPC	3	3	
15	DB63-20003A	GASKET	EPDM	1	1	
16	DB63-10034A	COVER-TERMINAL	NYLON	1	1	
17	DB32-10043F	THERMISTOR-OLP	204CT/103AT	1	1	
18	DB60-30018A	NUT-FLANGE	M5,SM20C	1	1	
19	DB99-00187A	ASSY-4WAY VALVE	ASS'Y	1	0	
	DB99-00168A	ASSY-4WAY VALVE	ASS'Y	0	1	
20	DB99-00186A	ASS'Y-CAPI TUBE	ASS'Y	1	0	
	DB99-00169A	ASS'Y-CAPI TUBE	ASS'Y	0	1	
21	DB96-01588A	ASS'Y-CONDENSER	ASS'Y	1	0	
	DB96-10502A	ASS'Y-CONDENSER	ASS'Y	0	1	
21-1	DB32-10040D	THERMISTOR-OUT	ASS'Y	1	1	
22	DB64-00433A	CABI-SIDE	SECC-P	1	1	
23	DB64-00400A	HANDLE-CABI RH	PP	1	1	

6-3 Remote Control & PCB Box

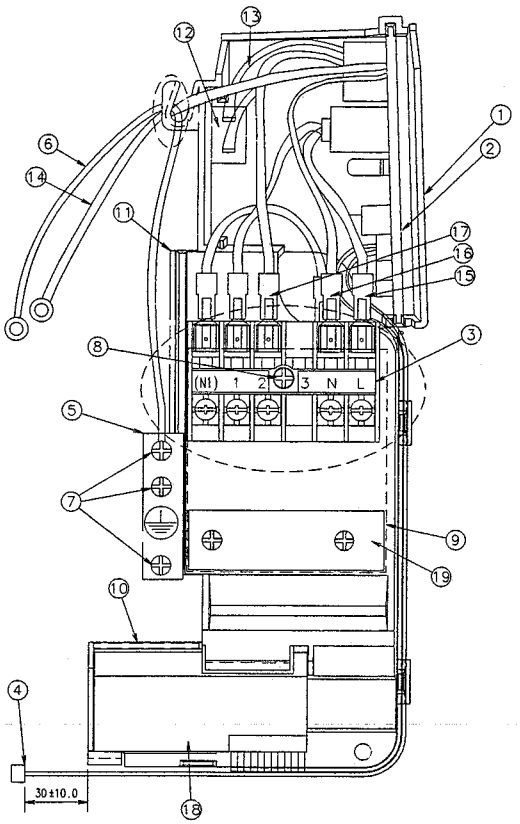
6-3-1 ASS'Y Remote Control : (DB93-00251L)



■ Parts List

No	Description	Q'TY	Remark
1	INLAY LCD	1	
2	CASE TOP	1	
3	LCD	1	
4	KEY RUBBER	1	
5	ASS'Y PCB REMOCON	1	
6	CASE LOW	1	
7	BATTERY COVER	1	

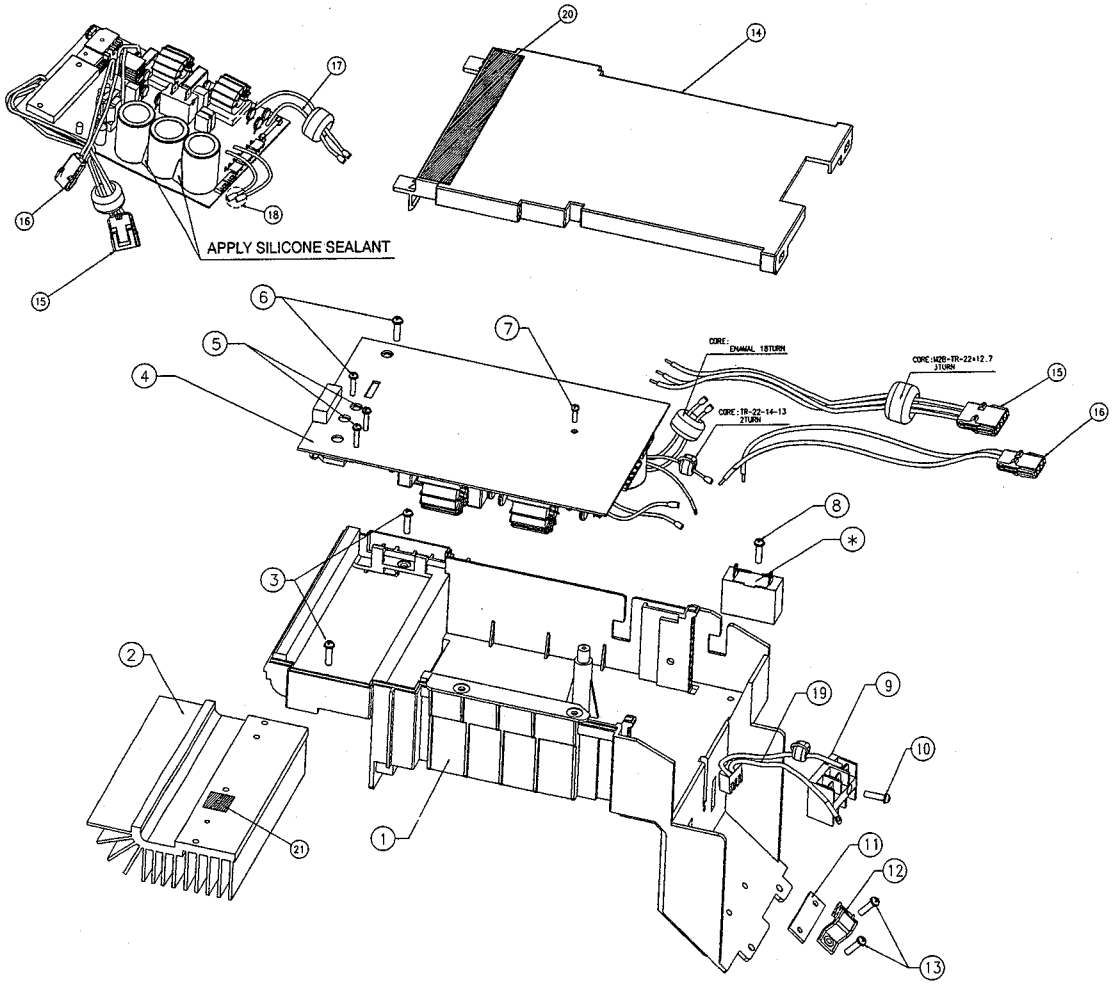
6-3-2 ASS'Y-Control IN(Indoor unit) : DB93-00960A

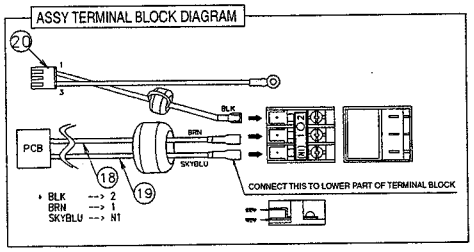


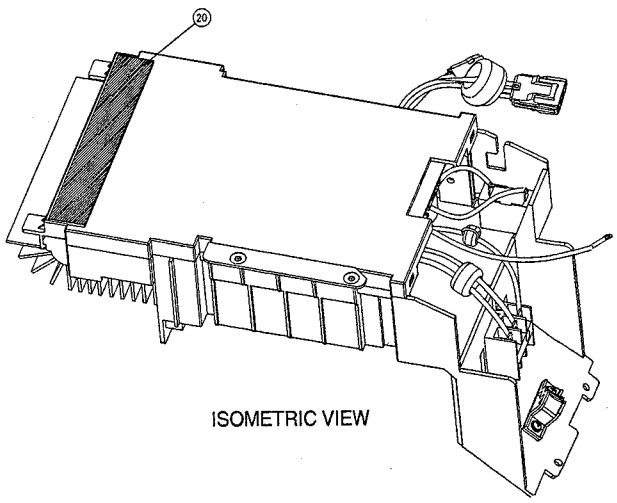
■ Parts List

No	Description	Specification	Q'ty
1	HOLDER CONTROL	ABS, UL94-V0	1
2	ASSY MAIN PCB		1
3	ASSY TERMINAL BLOCK	UL1015 AWG#16, ORG/SKY-BLUE/BRN	2
		ASTRO1010	4
		P.B.T+CF30%(BLK)	1
		C2680-1/2H	5
4	CONNECTOR WIRE FAN MOTOR	SMP250-05(1), SMT-250(5)	
		SMP200-05(1), YMT-200(5)	
5	BRACKET EARTH	SGCC-M	2
6	CONNECTOR WIRE EARTH	UL1015 AWG#16, GRN+YEL	2
7	SCREW	WP, TH, +, M4, L8, ZPC(WHT), T.C	1
8	CREW	PH, +, M3, L22, ZPC(YEL), SWRCH10A	1
9	HOLDER CLAMP IN	SGCC-M	1
10	SEAL-PANEL FRONT RH		1
11	SEAL-H/CONTROL FRONT		1
12	MF CAPAITOR	1200nF, 450V, 39.6 x 16 x 27	1
13	CONNECTOR WIRE MF CAPACITOR	ST730619	2
		UL1015 AW#22, WHT	2
14	CONNECTOR WIRE EARTH	UL1015 AWG#20, GRN+YEL	1
15	LEAD WIRE(N)	UL1015 ASG#16, ORG	1
16	LEAD WIRE(L)	UL1015 AWG#16, SKY=BLUE	1
17	LEAD WIRE(C)	UL1015 AWG#16, BLK	1
18	ASSY DISPLAY PCB		1

6-3-3 ASS'Y-Control-Out(Outdoor unit) - 9K : DB93-00962A / 12K : DB93-00962B







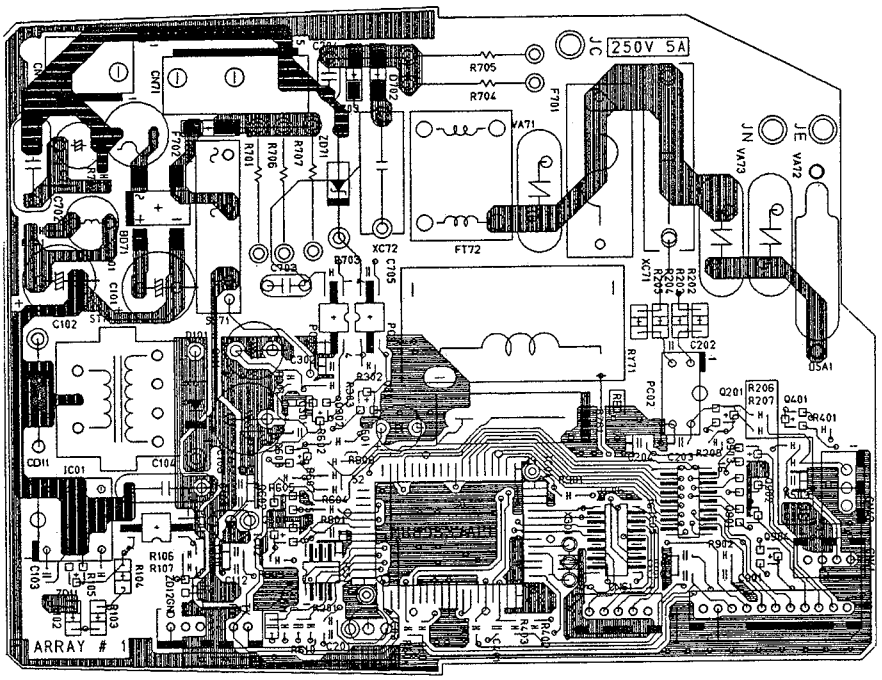
■ Parts List

No.	Description	Specification	Q'ty	
			DB93-00962A	DB93-00962B
1	CASE CONTROL BASE	RESIN-ABS	1	1
2	HEAT SINK	DB62-00774A	1	-
		DB62-01050A	-	1
3	SCREW-MACHINE	M4 x 16 WSP PH+	2	2
4	PCB-ASSY	DB93-00953A	1	-
		DB93-00953B	-	1
5	SCREW-MACHINE	M3 x 16 WSP PH+	2	2
6	SCREW-MACHINE	M4 x 16 WSP PH+	2	2
7	SCREW-TAPPING	M3 x 8 2S PH+	1	1
8	SCREW-TAPPING	M3 x 14 SWP PH+	1	1
9	ASSY TERMINAL BLOCK	CBF-HARNESS	1	1
10	SCREW-MACHINE	M4 x 25 WSP PH+	1	1
11	RUBBER CLAMP	NBR	1	1
12	HOLDER WIRE	RESIN-ABS	1	1
13	SCREW-MACHINE	M4 x 16 WSP PH+	2	2
14	COVER	RESIN-ABS	1	1
15	CONNECTOR WIRE COMP	UL1015 AWG#16/RED	1	1
		TR25-12G5/3T	1	1
16	CONNECTOR WIRE REACTOR	UL1015 AWG#16/WHT	1	1
17	CONNECTOR WIRE POWER	UL1015 AWG#16/SKY BLUE	1	1
		LSA13024/ENAMAL 18T	1	1
18	CONNECTOR WIRE RUN CAP.	UL1015 AWG#16/BLU	1	1
19	CONNECTOR WIRE AC	UL1015 AWG#16/GRN, YEL	1	1
		TR-22-1-13/2T	1	1
20	FOAMLEX	165 x 30 x T2	1	1
21	MICA	18.4 x 23.3 (Hole : ø3.6)	1	1
*	RUN CAPACITOR	1.7uF/ 400V	1	1

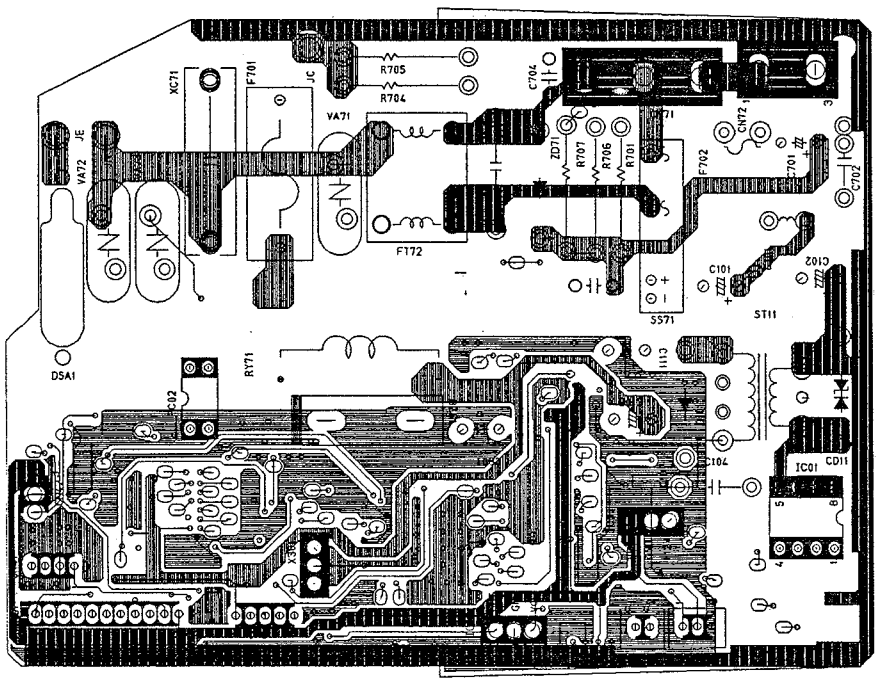
7. PCB Diagrams

7-1 ASS'Y PCB IN : DB93-00951A

■ TOP



■ BOTTOM

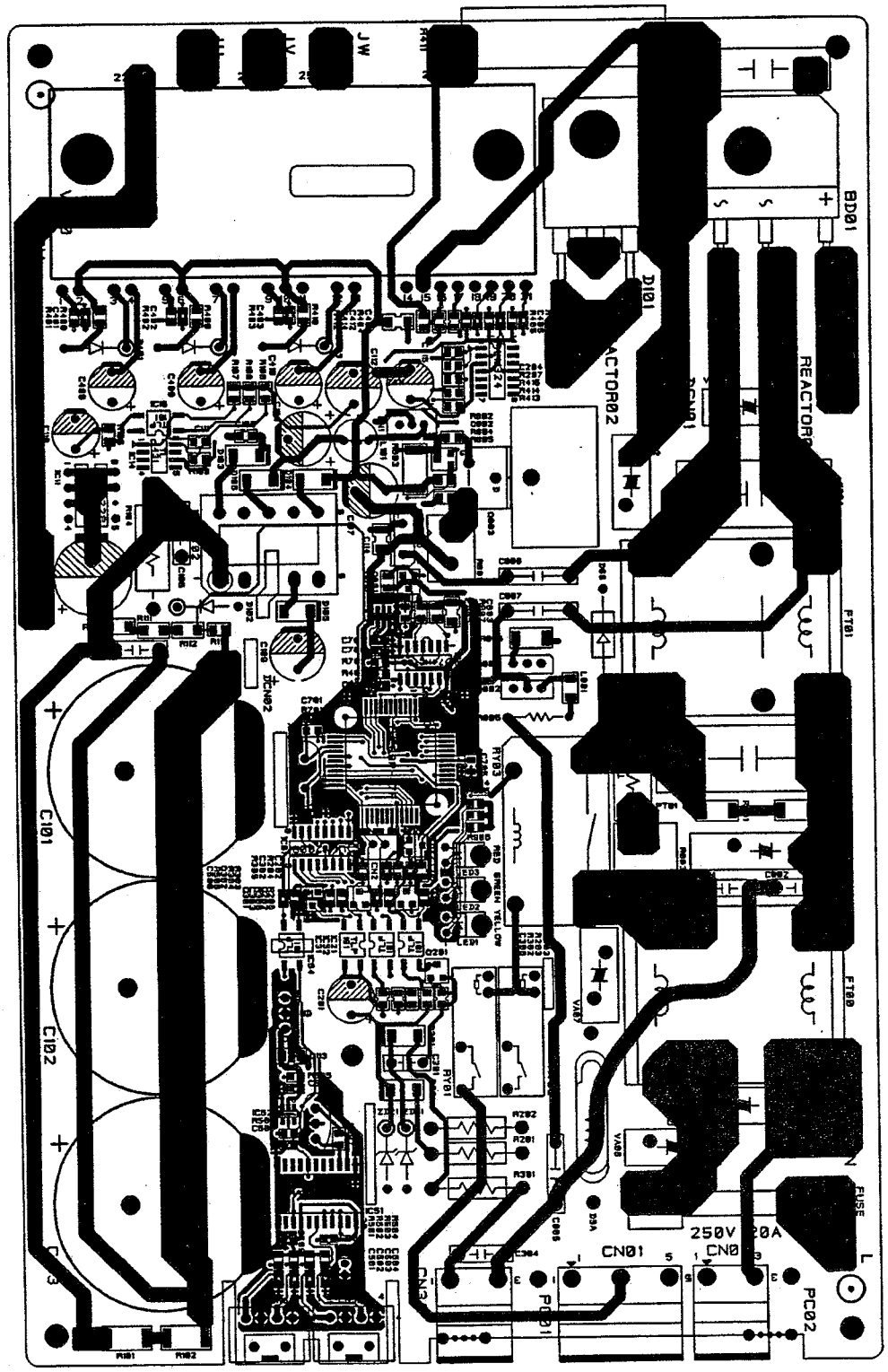


■ Parts List

No	Design Location	Description	Specification	Q'ty
1	D701,702,703	DIODE-RECTIFIER	MRA4005,600V,1A,SMA,TP	3
2	D101	DIODE-RECTIFIER	UG2B, 100V, 2A, DO-204AC,TP	1
3	BD71	DIODE-BRIDGE	DF06S, 600V, 1A, SMD-4,TP	1
4	ZD11	DIODE-ZENER	BZX84C3V/6, 350mW,SOT-23,T	1
5	ZD12	DIODE-ZENER	BZX84-C11, 6V, 35MW, S	1
6	ZD71	DIODE-ZENER	INR4749,24V/1W	1
7	CD11	DIODE-TVS	ST02D-200,200W,DO	1
8	Q201,401,602	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-2	2
9	Q603	TR-SMALL SIGNAL	MMST2907,PNP,200mW,SOT-	1
10	Q301,302,601	TR-SMALL SIGNL	DTC114EKA,PNP	3
11	Q901 ~ 904	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K	4
12	IC05,06	TR-ARRAY	ULN2003AFW,NPN,1W,SOP-16	2
13	IC04	IC-MCU	uPD780034	
14	IC51	IC-EEPROM	93LC56,128*16Bit,SOP	1
15	IC03	IC-VOLTAGE COMP	KA7533,TO-92,30,SINGLE	1
16	IC01	IC-PWM CONTROLLLER	TNY255P,DIP,8P,300MIL	1
17	IC02	REGULATER	KA78L05	
18	VA71,72,73	VARISTOR	470V,4500A,17*12mm,BK	3
19	R606	R-CHIP	560OHM,5%,1/10W,DA,TP,2012	1
20	R202 ~ R205	R-CHIP	100KOHM,5%,1/8W,DA,TP,3216	4
21	R206,601,602,902	R-CHIP	10KOHM,5%,1/10W,DA,TP,2012	4
22	R201,207,208,301,401,403,607,905	R-CHIP	1KOHM,5%,1/10W,DA,TP,2012	8
23	R102 ~ 104	R-CHIP	220KOHM,5%,1/8W,DA,TP,3216	3
24	R106,107	R-CHIP	220OHM,5%,1/10W,DA,TP,2012	2
25	R503,504	R-CHIP	330OHM,5%, 1/10W,DA,TP,2012	5
26	R101,303,603,703,901	R-CHIP	4.7KOHM,5%,1/10W,DA,TP,2012	5
27	R105,302,604,605	R-CHIP	470OHM, 55,1/10W,DA,TP,2012	2
28	R501,502	R-CHIP	6.8KOHM,1%,1/10W,DA,TP,2012	1
29	R510,511	R-CHIP	47KoHM,5%,1/10W,TP,2012	2
30	R701,706,707	R-CARBORN	82KOHM,2W	3
31	R704,705	R-CARBORN	10KOHM,2W	2
32	R702	R-CARBORN	100KoHM,1/10W	1
33	R402	R-CHIP	6.8KOHM,5%,1/10W,DA,TP,2012	1
34	XC71	C-CERAMIC	DISC,2.2nF,20%,400V,Y5V,TP,12	1
35	C106	C-AL	1000uF,10%,25V	1
36	C702	C-CERAMIC	10nF,+8—20%,50V,Y5V,TP1	
37	C703	C-CERAMIC	4.7nF,275V	
38	C301,510,511,903	C-CHIP	CL21B102KBNC	2
39	C203,204,401,705	C-CHIP	CL21B103KBNC	4
40	C103,107,109,110,112,201,202,302,500,501,502, 901	C-CHIP	CL21B104KBNC	11
41	XC72	C-FILM	100nF,10%,275V,BK,18*6*12,15	1
42	C111	C-AL	470uF,20%,16V,GP,TP,10*12.5,5	1
43	C601,701	C-AL	47uF,20%,50V,GP,TP,6.3*11,5	1
44	C101,102	C-AL	6.8uF,20%,450V,GP,TP,10*16,T	2
45	X301	RESONATOR-CERAMIC	10MHz,0.5%,TP,10*5	1
46	SS71	SSR	12VDC,2A,1mS	1
47	F702	FUSE	250V,1A,TIME-LAG	1
48	F701	FUSE-HOLDER	FUSE-HOLDER	1
49	F701	FUSE	250,5A	1
50	CN72	CONNECTOR-HEADER	YW396-03AV,WHT	1
51	CN71	CONNECTOR-HEADER	YW396-05AV,WHT	1
52	CN42	CONNECTOR-HEADER	SMW250-03,BLU	1
53	CN41	CONNECTOR-HEADER	SMW200-04,WHT	1
54	CN91	CONNECTOR-HEADER	SMW200-12,WHT	1
55	CN61	CONNECTOR-HEADER	SMW200-05,WHT	1
56	ST11	TRANS SWITCHING	DC12V	1
57	DSA1	POSISTOR	DSA-332M,2pF,MAX,100MOHM	1
58	PC01	PHOTO-COUPLER	TLP181GB	1
59	PC31,32	PHOTO-COUPLER	TLP181	2
60	PC02	PHOTO-COUPLER	TLP620GR	1
61	BZ61	BUZZER	CBE2220BA	1
62	FT72	FILTER	LS403110	
63	RY71	RELAY-POWER	UKH-12S	1

7-2 ASS'Y PCB Control-Out : DB93-00953A

■ TOP



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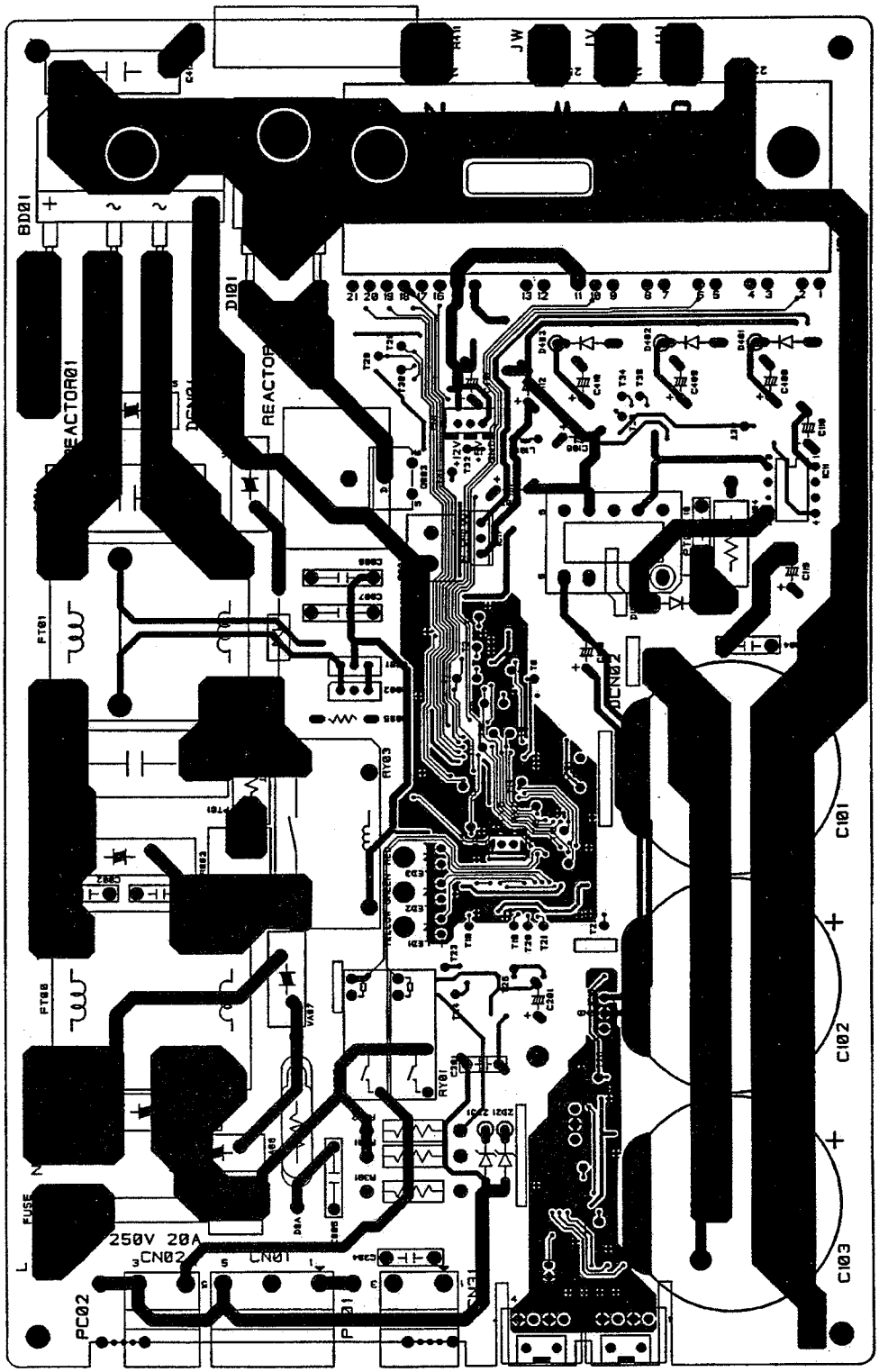

BD101
REACTOR101
D101
FT101
FT102
FUSE
250V 20A
CN02
CN01
PC02
JCN02
C101
C102
C103

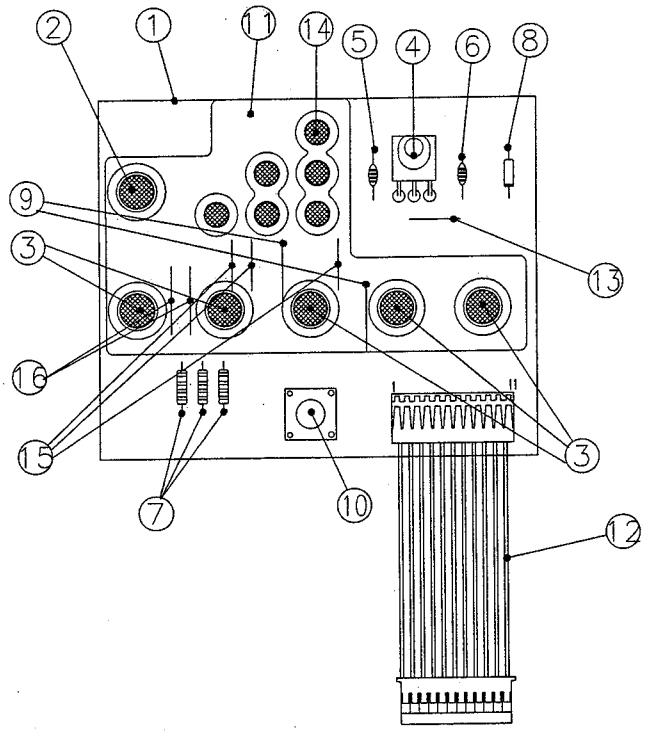
■ Parts List

No	Design Location	Description	Specification	Q'ty
1	C101,C102,C103(7k,9k)	C-AL	RADIAL,560UF,105°,20%,400V,2PIN,BK,35x50mm	3
2	C101,C102,C103(12k)	C-AL	RADIAL,680uF,105°,20%,400V,2PIN,BK,35x50mm	3
3	C115	C-AL	RADIAL,RG 450V 10UF 12.5*20 TP	1
4	C408,C409,C410	C-AL	RADIAL,RZ 35V 22uF 6.3x11 TP	3
5	C110,C201,C415	C-AL	RADIAL,RZ 35V 47uF 6.3x11 TP	3
6	C107,C108,C109,C112	C-AL	RADIAL,WD 25V 220uF 8x11.5 TP	4
7	CABLE(JU;JV;JW=RED;BLU;YEL)	CBF-HARNESS	HA01, #16, 270,280,290mm,RED,BLU,YEL(COMP)(CORE #1)	1
8	CABLE(REACTOR01;02=YEL;WHT)	CBF-HARNESS	HA02, #16, 270,270mm,WHT,YEL(REACTOR)	1
9	CABLE(DCN01/DCN02)	CBF-HARNESS	HA04, #16, 140mm,BLU(DC-)	1
10	CABLE(PC01;PC02)	CBF-HARNESS	HA05, #20, 140mm,WHT(CON)	2
11	C303	C-CERAMIC,CHIP	CL10B102KBNC	1
12	C302,C506	C-CERAMIC,CHIP	CL10B103KBNC	2
13	C401,C402,C403,C404,C405,C406, C407	C-CERAMIC,CHIP	CL10C101JBNC	7
14	C701,C702	C-CERAMIC,CHIP	CL10C220JBNC	2
15	C202,C501,C502,C503,C504,C505, C507,C508,C509,C703,C704,C706	C-CERAMIC,CHIP	CL10F104ZANC	12
16	C203	C-CERAMIC,CHIP	CL21B102KBNC	1
17	C305,C306	C-CERAMIC,CHIP	CL21B103KBNC	2
18	C106,C111,C116,C204,C705,C802	C-CERAMIC,CHIP	CL21B104KBNC	6
19	C414	C-CERAMIC,CHIP	CL21B222KBNC	1
20	C412	C-CERAMIC,CHIP	CL21B223KBNC	1
21	C113,C114,C411,C803	C-CERAMIC,CHIP	CL31F105ZANC	4
22	C104,C105,C304	C-CERAMIC,DISC	RADIAL,SC E 222M 10FF7	3
23	C005,C006,C007	C-CERAMIC,DISC	RADIAL,SCE 103Z 14FF7	3
24	C001,C002	C-CERAMIC,DISC	RADIAL,SCE 472M 14FF7	2
25	C301	C-FILM,MPET	RADIAL,5TY2ARB103KAN TP	1
26	C413	C-FILM,MPP	RADIAL,PC2J104K 630V TP	1
27	C004	C-FILM,MPPF	RADIAL,330nF,10%,275V,TP,26x8.5x18m	1
28	C003	C-FILM,MPPF	RADIAL,680nF,10%,275V,BK,31x11x21	1
29	Running capacitor(Main case+ screw)	C-FILM,MPPF	RMES-45H015UA	1
30	CABLE (L;N=BRN;BLU)	COIL CHOKE ASS'Y	(LSA15009 ASS'Y, —mH,43X32X28mm,18Turn,CABLE)+C54	1
31	FT00	COIL CHOKE	LS615014,—mH,38.5x38x30mm, 20Turn, 4PIN	1
32	FT01	COIL CHOKE	LS615014S,—mH, 38.5X38X30mm,15Turn ,6PIN	1
33	L101	COIL CHOKE	RADIAL,10mH(DR6.5*7.5)	1
34	L001	COIL-CHIP	FCI 3216 R47K (0.47uH)	1
35	CN51	CONNECTOR-HEADER	SMAW250A-04,RED,YENHO	1
36	CN52	CONNECTOR-HEADER	SMAW250A-04,WHT,YENHO	1
37	CN02,CN31	CONNECTOR-HEADER	YAW396A-03AV,WHT,YENHO	2
38	CN01	CONNECTOR-HEADER	YAW396A-05AV,WHT,YENHO	1
39	X501	CRYSTAL-RESONATOR	CST 4MHZ	1
40	X701	CRYSTAL-RESONATOR	HC-49/S,12.288MHz	1
41	D301,D103,D104,D105,D106	DIODE	ES1D,D0-214AC, 200V	5
42	D101	DIODE	FEP30JP,FORMING	1
43	D201	DIODE	US1G,D0-214AC, 400V	1
44	BD01	DIODE-BRIGE	GS1B2560,FORMING	1
45	ZD21	DIODE-ZENER	AXIAL,1N4749A	1
46	ZD31	DIODE-ZENER	AXIAL,1N4751A	1
47	D102,D401,D402,D403	DIODE-ZENER	AXIAL,1N4937	4
48	ZD22	DIODE-ZENER	MMBZ5232B	1
49	FUSE	FUSE	65TL 250V,20A	1
50	FUSE CLIP	FUSE-CLIP	FC61B	2
51	H/S(PFC)	HEAT SINK	27X17.5X40	1
52	IC51	IC-MASK	S3C9434XZ0-SKB4	1
53	IC83	IC-LOGIC	74HCT00D,SOP-14	1
54	IC41	IC-LOGIC	LM324D	1
55	IC81	IC-LOGIC	ULN2003ADR	1
56	MICOM	IC-MICOM	TMP88PH47F(MASK),QFP	1
57	IC15,IC21,IC31,IC32,IC54	IC-PHOTO-COUPLER	TLP181(GRH-TLP),SOP,TP	5
58	IC11	IC-PWM CONTROLLER	TOP222P	1
59	IC16	IC-REG	KA78L05AZTA(0.1A Positive Vol Reg)	1

■ Parts List

No	Design Location	Description	Specification	Q'ty
60	IC17	IC-REG	KA78M05TU(0.1A Positive Vol Reg)	1
61	Q801	IC-TR	BC847B,NPN, SOT-23	1
62	Q002	IC-TR	KTA1715	1
63	Q001	IC-TR	KTC2814	1
64	Q201,Q202,Q301,Q302,Q802	IC-TR-DIGITAL	KRC102S,NPN,200mW,10K-10K,SOT	5
65	Q803	IC-TR-IGBT	IRG4BC30F(004).TO-220AB, IR	1
66	IC14	IC-VOL REF	KA431DTF(3-Terminal Adjustable Reg)	1
67	IC52,IC71	IC-VOL	RN5VT45(46)CA,SOT-23-5	2
68	IPM(7k,9k)	IPM	PS21244-E, MIT,600V,15A	1
69	IPM(12k)	IPM	PS21245, MIT,600V,20A	1
70	LED2	LED_GRN	SM4433(FORMING)	1
71	LED3	LED_RED	SA4433(FORMING)	1
72	LED1	LED_YEL	SY4433(FORMING)	1
73	PCB	PCB	FR4,GREEN, 220X140mm, 15/20A-MISTU	1
74	R801	R-CEMENT(S)	3RJ 0.045ohm(10%,3W,CB,BK,12x8x25mm)	1
75	R003	R-CEMENT(S)	5RJ 200ohm(5%,5W,CB,BK,13x9x25.5mm)	1
76	R411	R-CEMENT(S)	7RJ 0.015ohm(10%,7W,CA,BK,35x9.5xmm)	1
77	R501,R504	R-CHIP	MCR03EZH F1802, 18Kohm, 1/10W, 1%, 1608	2
78	R502,R503	R-CHIP	MCR03EZH F2402, 24Kohm, 1/10W, 1%, 1608	2
79	R205,R904,R905,R906	R-CHIP	MCR03EZH J102, 1.0Kohm, 1/8W, 5%, 1608	4
80	R204	R-CHIP	MCR03EZH J203, 20Kohm, 1/10W, 5%, 1608	1
81	R505	R-CHIP	MCR03EZH J331, 330ohm, 1/10W, 5%, 1608	1
82	R303, R304	R-CHIP	MCR03EZH J471, 470ohm, 1/8W, 5%, 1608	2
83	R305,R401,R402,R403,R404,R405 R406,R407,R506,R508,R702	R-CHIP	MCR03EZH J472, 4.7Kohm, 1/10W, 5%, 1608	11
84	R306	R-CHIP	MCR03EZH J561, 560ohm, 1/10W, 5%, 1608	1
85	R101,R102	R-CHIP	MCR100EZH J184, 180kohm, 1W, 5%, 6432	2
86	R803	R-CHIP	MCR100EZH J222, 2.2Kohm, 1W, 5%, 6432	1
87	R810	R-CHIP	MCR10EZH F1002, 10Kohm, 1/8W, 1%, 2012	1
88	R113	R-CHIP	MCR10EZH F1502, 15Kohm, 1/8W, 1%, 2012	1
89	R109	R-CHIP	MCR10EZH F1801, 1.8Kohm, 1/8W, 1%, 2012	1
90	R805	R-CHIP	MCR10EZH F2201, 2.2Kohm, 1/8W, 1%, 2012	1
91	R108	R-CHIP	MCR10EZH F6801, 6.8Kohm, 1/8W, 1%, 2012	1
92	R106	R-CHIP	MCR10EZH J102, 1.0Kohm, 1/8W, 5%, 2012	1
93	R207,R806,R807	R-CHIP	MCR10EZH J103, 10Kohm, 1/8W, 5%, 2012	3
94	R507,R701	R-CHIP	MCR10EZH J105, 1.0Mohm, 1/8W, 5%, 2012	2
95	R414	R-CHIP	MCR10EZH J202, 2.0Kohm, 1/8W, 5%, 2012	1
96	R413	R-CHIP	MCR10EZH J203, 20Kohm, 1/8W, 5%, 2012	1
97	R802	R-CHIP	MCR10EZH J221, 220ohm, 1/8W, 5%, 2012	1
98	R412	R-CHIP	MCR10EZH J222, 2.2Kohm, 1/8W, 5%, 2012	1
99	R408,R409,R410	R-CHIP	MCR10EZH J330, 33ohm, 1/8W, 5%, 2012	3
100	R107	R-CHIP	MCR10EZH J332, 3.3Kohm, 1/8W, 5%, 2012	1
101	R203,R302,R804	R-CHIP	MCR10EZH J472, 4.7Kohm, 1/8W, 5%, 2012	3
102	R415	R-CHIP	MCR10EZH J473, 47Kohm, 1/8W, 5%, 2012	1
103	R105	R-CHIP	MCR10EZH J6R8, 6.8ohm, 1/8W, 5%, 2012	1
104	R110,R111,R112	R-CHIP	MCR18EZH F4703, 470Kohm, 1/4W, 1%, 3216	3
105	R001, R002	R-CHIP	MCR50EZH F4703, 470Kohm, 1/2W, 1%, 5025	2
106	R004	R-CHIP	MCR50EZH J101, 100ohm, 1/2W, 5%, 5025	1
107	RV01,RV02	RELAY	F3AA012E	2
108	RV03	RELAY-POWER	UKH-12S,12VDC	1
109	R005	R-METAL OXIDE(S)	AXIAL,MOR 1/4TSJ 100ohm, 5%, 1/4W, AA TP	1
110	R202	R-METAL OXIDE(S)	AXIAL,MOR 2TSJ 100Kohm ,5%,2W,AA,TP	1
111	R201	R-METAL OXIDE(S)	AXIAL,MOR 2TSJ 47Kohm,,5%,2W,AA,TP)	1
112	R301	R-METAL OXIDE(S)	AXIAL,MOR 2TSJ 5.6Kohm,5%,2W,AA,TP)	1
113	R104	R-METAL OXIDE(S)	MOR 3TSJ 47Kohm,5%,3W,AA,TP)	1
114	DSS	SURGE-ABSORBER	AXIAL,300V,DSS-301	1
115	DSA	SURGE-ABSORBER	AXIAL,500V,DSA-501	1
116	PT01	THERMISTER-PTC	J512Q24E270M265	1
117	PT02	TRANS-PULSE	PT_20A , 1.4mH	1
118	VA02,VA05,VA06,VA07	VARISTER	470V,0.6W,50A,14MM,INR14D471K	4
119	VA01,VA04	VARISTER	470V,0.6W,50A,14MM,INR20D471K	2

7-3 ASS'Y DISPLAY(DB93-00969A)

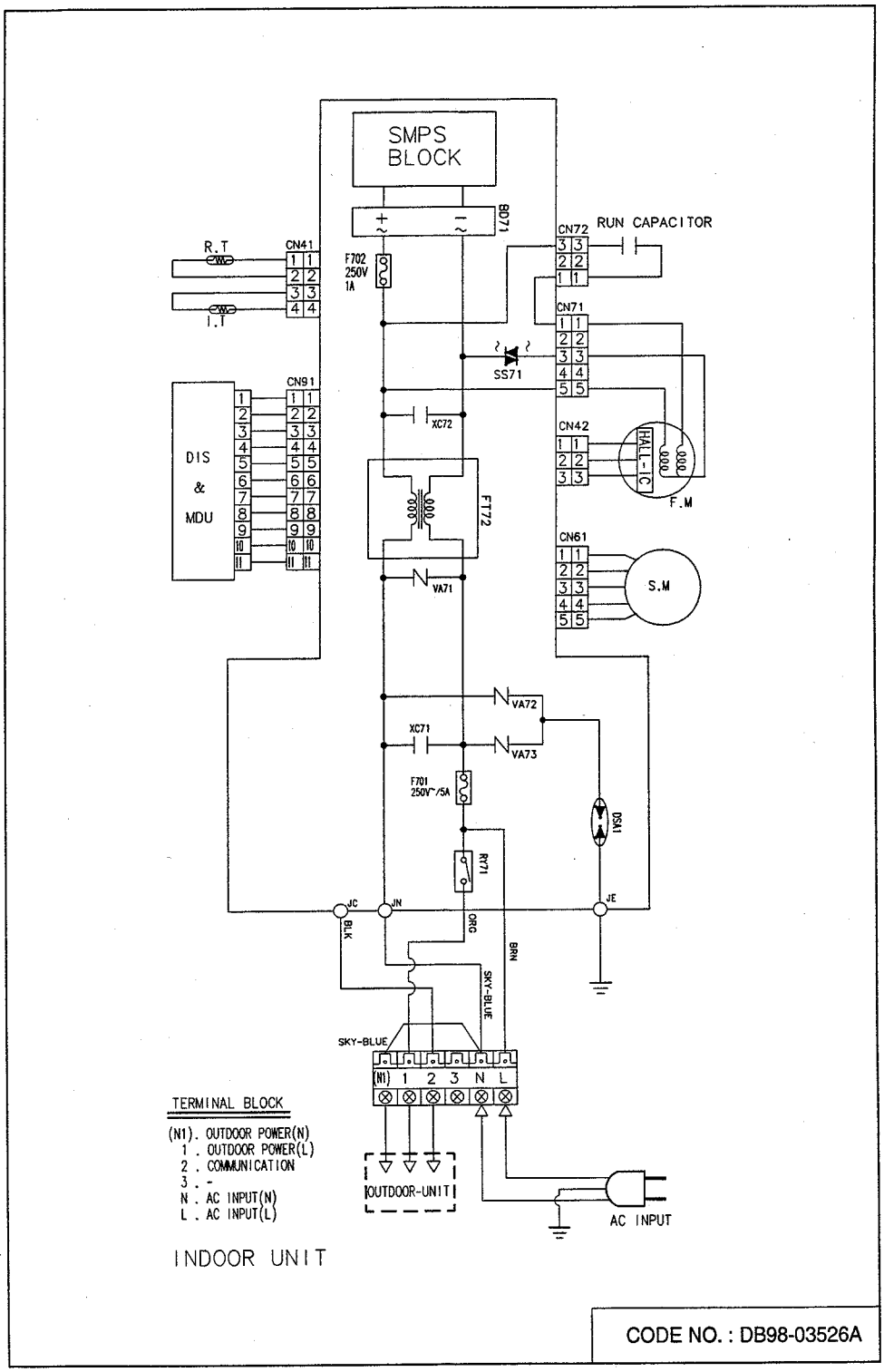


■ PART LIST

No	Description	Specification	Q'TY
1	PCB-DISPLAY	FR-1 T1.6	1
2	LED-LAMP	SY5511 (YEL)	1
3	LED-LAMP	SO5511 (ORG)	5
4	MODULE REMOCON	KSM-313TH5	1
5	C-CERAMIC	CA 0A 50V 102K	1
6	C-CERAMIC	CA 0A 50V 104Z	1
7	R-CARBON	470 1/2W 5%	3
8	DIODE SWITCHING	1N4148	1
9	JUMP-WIRE	10mm	2
10	TACT SWITCH	KPT-1105A	1
11	COVER DISPLAY UP	ABS	1
12	C/W DIS & HODULE	UL1007 AWG/26/11	1
13	JUMP-WIRE	7.5mm	1
14	LED-LAMP	SR3511(RED)	1
15	JUMP-WIRE	7.5mm	0
16	JUMP-WIRE	10mm	0

8. Wiring Diagrams

8-1 Indoor Unit



MEMO

UPDATE LOG SHEET

Application date	Page	Part#	Note(Cause & Solution)	S/Bulletin#

Use this page to keep any special servicing information. (Service Bulletin, etc.)
If only parts number changes, Just change parts number directly on parts list.
And if you need more information, please see the service website.

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